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This thesis demonstartes that Army Aviation can perform many functions during Military Operations in Urban Terrain (MOUT). It will address how helicopters can provide support to the MOUT Commander on a routine basis in an environment characterized by a sophisticated air defense threat.

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This thesis shows that our doctrine is viable. It examines the helicopter's limitations and addresses what is being done to overcome these limitations. It portrays to the reader how helicopters can be employed now, and in the future during MOUT operations.

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A thesis presented to the Faculty of the U.S. Army Command and General Staff College in partial fulfillment of the requirements for the degree

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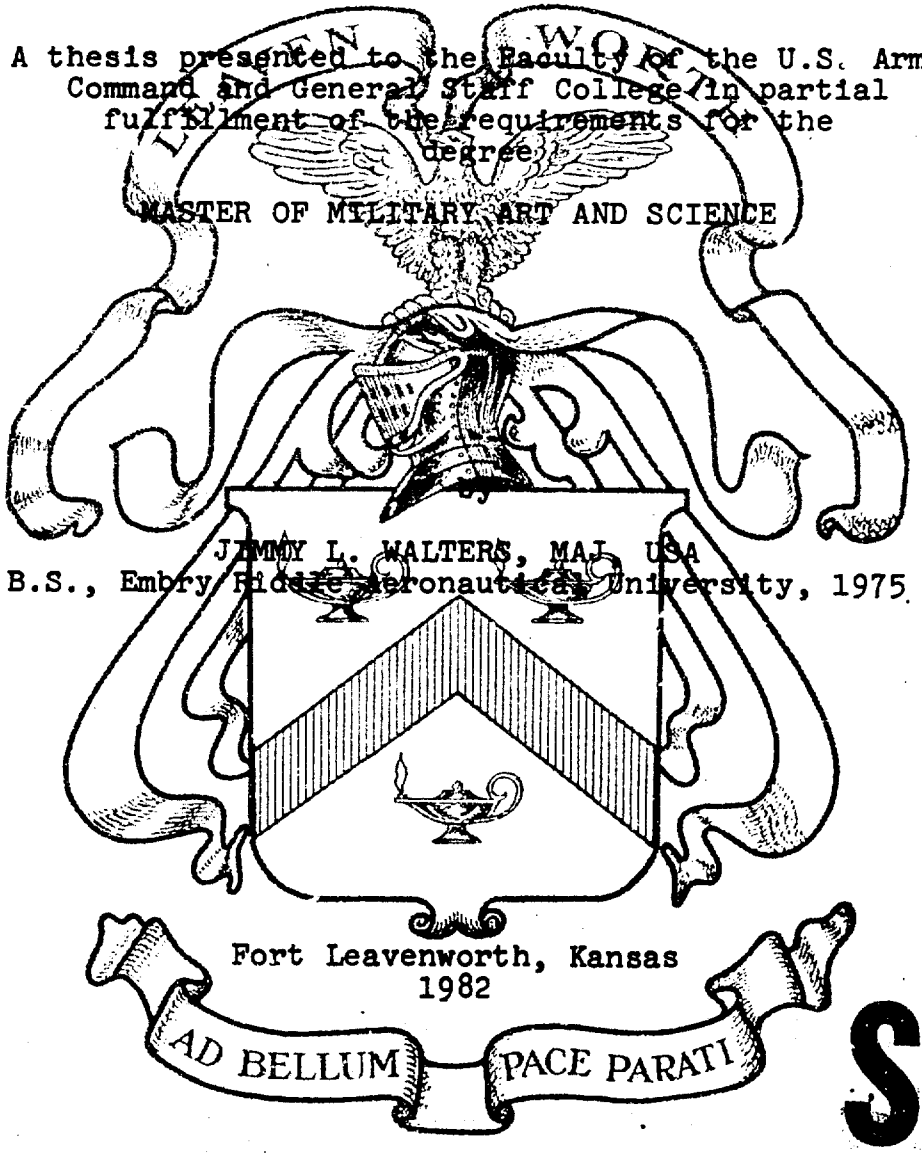

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The opinions and conclusions expressed herein are those of the student author and do not necessarily represent the views of the U.S. Army Command and General Staff College or any other governmental agency. (References to this study should include the foregoing statement.)

ABSTRACT

AVIATION IN THE SUPPORT OF MOUT, by Major Jimmy L. Walters, USA, 100 pages.

This thesis demonstrates that Army Aviation can perform many functions during Military Operations in Urban Terrain (MOUT). It will address how helicopters can provide support to the MOUT commander on a routine basis in an environment characterized by a sophisticated air defense threat.

Despite what current doctrine states, many people, both aviators and non-aviators, feel that the helicopter has too many limitations to overcome before it can be considered as a feasible means of support in MOUT operations. Others consider the use of helicopters in MOUT by prefacing any possible employment with a whimsical notion of air superiority or using them during the absence of the enemy's air defense capabilities.

This thesis shows that our doctrine is viable. It examines the helicopter's limitations and addresses what is being done to overcome these limitations. It portrays to the reader how helicopters can be employed now, and in the future during MOUT operations.

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CHAPTER I

INTRODUCTION

"THE WHY AND THE WHAT"

As today's Army prepares itself to succeed in future conflicts, it formulates doctrine to provide a basis for training soldiers and units in the accomplishment of war time missions. A doctrinal area that receives little if any emphasis is the use of Army Aviation in support of Military Operations in Urbanized Terrain (MOUT).

Regardless of what current doctrine states, many people both aviators and non-aviators, feel that helicopters cannot survive in a MOUT environment. This thesis demonstrates that rotary wing operations can be employed by the MOUT commander, and provides examples of how helicopters can be utilized both now, and in the future, during MOUT operations.

Before discussing how Army Aviation, i.e., helicopters, can be used during MOUT, it is necessary to first consider why we should concern ourselves with operating in urban areas - what do the Soviets intend to do about these areas? What importance do such areas have on today's battlefield? Finally, what missions can helicopters perform which will assist in MOUT operations?

The world has experienced a massive growth in built-up areas and man-made changes to the natural landscape since World War II. This trend towards urbanization is projected to continue at an ever increasing rate. The projected rate of increase of the agglomerated population outstrips the projected rate of increase of regional population. Even Europe, one of the more developed world regions with the lowest projected rate of population increase in the period 1960 to 2000, is expected to have a rate of increase in urban population that far exceeds that of the general population. 1/ Furthermore, these rates of increase in urbanization are expected to be greater in the less developed world regions than in the more developed regions.

As urban areas grow in size and population, they also have increased contacts with other urban areas by means of improved transportation and communications. This draws the relatively free-standing discrete entities into a complex system where each town or city becomes an integral part of a much larger community. This emerging entity is called an "ecumenopolis - a settlement form of great areal dimensions and population and with a number of major nodes or growth poles linked together into a network." 2/ The ecumenopolis is considered to be the next stage in the evolution of urbanization and will encompass tens of millions of people.

Almost all scenarios of European conflict assume that war will occur in the vacant, rolling terrain of the

northern plain of West Germany. Many politically sensitive questions can be avoided by holding this assumption. But cities are strategically important, not just because their continued growth threatens to engulf these open areas. They are also the political nerve centers of the developed nations, and, since all military actions are directed towards political goals, they will necessarily be drawn into political and military conflict. 3/

Current doctrine regarding MOUT operations for both the Soviets and the U.S. stresses that built-up areas should be bypassed if at all possible. The new FM 100-5 Operations starts off by quoting Sun Tzu when he said that "the worst policy of all is to besiege walled cities", and then goes on to say that due to the enormous resources required, the restricted maneuver room and the time consumed during MOUT operations that . . . "committing forces to urban areas should not be undertaken unless there is some specific advantage which the attacker or defender can realize." Next, it alludes that due to expanding urban belts, modern armies fighting in industrialized areas of the world might have greater difficulty in avoiding urban combat. 4/

Soviet doctrine also stresses the importance of bypassing cities and towns if possible. One tactical reason which they address when deciding whether or not to conduct MOUT operations is the unavoidability of a built-up area due to the extent of urbanization. 5/ Major General

A.K. Shovkolovich, the author of the book Combat Action of a Motorized Rifle Battalion in a City, makes some interesting comments in the introduction to his book. He says that on the European battlefield, the Soviet Army will fight through a major urban complex every 40 to 60 kilometers. By the Soviets' definition, an urban complex consists of a population in excess of 100,000 people with a circumference of approximately 50 kilometers. Put another way, General Shovkolovich is saying that the Soviets will be fighting in urban areas somewhere between 15 to 25 percent of the time! 6/

It appears that both the U.S. and the Soviets stated doctrine alludes toward avoidance of the city in favor of the more open, maneuverable terrain on which to base their defense or offensive actions. With this as the objective for the proper utilization of terrain, a conflict between doctrine and reality becomes apparent when you consider that these open areas are being chopped up more and more by the trend towards the ecumenopolis' of tomorrow. Another factor to consider is that of exploiting an enemy's vulnerabilities; with the majority of forces arrayed throughout the battlefield in the defense of maneuverable terrain, the urban areas become weak points in the defense which the enemy is naturally channalized into. A report by Lilita I. Dzirkals and others on past, present, and future aspects of MOUT operations states that: . . . "when looking at an urban area nowadays with a view to defending it, one should

perhaps design what might be called a 'bypassability quotient' that would tell us just how hard or easy a city or town would be to bypass for an invading force. Presumably, the strategic aim of NATO will be to render urban areas less bypassable by defending the spaces in between. But if successful, such a strategy might force an invading enemy -- and therefore also NATO forces -- into the cities which, traditionally, armies would rather avoid." 7/ I think S.L.A. Marshall in his "Notes on Urban Warfare" best expresses the inevitability of fighting in cities when he reminds us that "man, like a running stream, advances mainly by taking the path of least resistance. So it is with armies . . . the same roads of antiquity to invade Europe were used again by invading forces in the two world wars. Being the easiest and most natural routes, they were also the lines along which human habitations, some large, some small, had come to cluster." 8/

During World War II, the Soviets were engaged extensively in MOUT operations ranging from the defense of Leningrad (1941-1943) and Sevastopol (1942) to offensive operations against the Germans as a part of Hitler's "Breakwater" Doctrine and against Berlin in 1945.

> One leadership principle which Hitler adopted more and more toward the end of the war, might be called the "Breakwater" Doctrine. Its essence was to improve a transformation of cities into "fortresses" and continue to defend them even when the enemy had already bypassed them to the right and left. This doctrine produced a whole series of such "fortresses" in the West. But Hitler followed this tactic also in the East, on the

> assumption that the enemy needed more forces to take such a fortress than were needed to defend it. This assumption was in turn based on another: that the enemy had to reduce these pseudo-fortresses as he needed their harbors or traffic centers. However, this was true only in some cases, and if the enemy really needed more forces to reduce a fortress than were needed to defend it, he could use inferior troops for the purpose. With regard to the Red Army, Hitler's theory was very much a miscalculation, as its forces were at all times numerically superior to the German forces in the East. 9/

Based upon such combat experiences, the Soviets' current offensive concept for MOUT operations stresses the need for their leading echelons to cut off and destroy enemy forces through meeting engagements before these forces can occupy the built-up areas. If this is not possible, then the first echelons will bypass these pockets of resistance and continue their advance. The second or following echelons have the task of sealing off and neutralizing the enemy within these built-up areas. 10/

Acknowledging that some form of military operations in urbanized terrain is liable to occur during hostilities, where then does the helicopter enter into the picture as a viable combatant? Historically, there are insufficient examples for this thesis to state that such useage has been proven in combat. Those few instances in which helicopters were used in Vietnamese city fighting usually saw an unsophisticated air defense threat oppose helicopters with none of today's survivability equipment. In 1968, an air assault to the roof of the U.S. Embassy in Saigon was successful in dislodging the Viet Cong sappers who had

captured the building. 11/ The battle for Hue occurred during 1969, however, this intense three weeks of fighting received little helicopter support due both to adverse weather and to a dense array of enemy machine guns. 12/ The battle for An Loc in 1972 saw a much more sophisticated air defense threat composed of 12.7mm and 37mm anti-aircraft guns as well as SA-2 and SA-7 missiles employed against the AH-1G Cobra. The Cobras defeated the initial armor thrust into the city with 2.75 inch rockets and continued to operate within and around An Loc until the air defense umbrella became impenetrable for helicopters. 13/ An Loc in the closing days is the scene that most aviators envision and then seem appalled at the mention of helicopters and MOUT synonomously. Notwithstanding the fact that those AH-1G Cobras with no survivability equipment, save for the pilot's armored vest, destroyed an enemy armored force that threatened the fall of Saigon and kept the Viet Cong out of An Loc for several days, permitting reinforcements to arrive before the enemy's air defenses forced their retirement from the scene. S.L.A. Marshall references the Vietnam actions discussed above when he speculates that: "There is no reason to believe other than that the helicopter has a major role in built-up area warfare as the main transporter of men and supplies up to (emphasis added) the battle zone." 14/ At this point in time, the U.S. started re-examining its then current doctrine on MOUT.

In January 1972, the Assistant Commandant of the United States Army Infantry School created a study group for the purpose of validating and expanding existing MOUT doctrine by identifying voids and weaknesses for the promulgation of doctrinal changes applicable throughout the spectrum of urban warfare. 15/ When considering the application of airmobility to combat in cities, the study group reached the following conclusion: 16/

> The potential for using airmobility for combat in cities has only recently been addressed. There have been a few instances of combat in cities in which airmobile forces were employed in the Republic of Vietnam; however, doctrine on this subject is almost nonexistent. An examination of the current doctrine for combat in fortified and built-up areas (FM 31-50) reveals a lack of guidance for use of airmobile forces and aviation assets. (Author's Note: FM 31-50 has been replaced by FM 90-10, Military Operations on Urbanized Terrain [MOUT].)
>
> a. Disadvantages. The problem areas associated with the planning and conduct of airmobile operations in combat in cities would probably be identical to problems posed by any airmobile operation. Certain difficulties could be amplified due to the nature of city fighting and the abundance of manmade obstacles.
>
> (1) Air Superiority. The need for tactical air superiority should be considered. Airmobile forces, in the phases of combat in cities, could be particularly vulnerable if enemy forces have air superiority. Utility and medium transport helicopters could have extreme difficulty operating around and over the built-up area because of the lack of cover and concealment.
>
> (2) Snipers and Antiaircraft Fires. One of the major problems facing aviation operations in combat in cities could be the difficulty in eradicating sniper and antiaircraft fires. The city affords ideal cover and concealment for both snipers and small antiaircraft weapons in the vicinity of rooftops where helicopters would be operating.

(3) Landing Zones. The availability of large landing zones in a city could be a major problem. The movement of platoon or company sized elements into the city in a single lift to engage critical areas or key buildings could pose a problem due to the lack of multiple ship landing zones. Consideration of landing zones for multiple ships would probably be limited to municiple parks, large sports arenas, and the major transportation arteries such as four-lane highways.

b. Advantages

(1) Combat Support. One of the major advantages to be gained in the use of aviation assets could be the employment of aerial weapons platoons for combat support. The role of the armed helicopter as a direct fire weapon has been tried and proven in combat. In the specialized environment of a city with narrow streets and buildings with block-type construction, the aerial weapons platform could provide highly effective supporting fires in areas where conventional artillery might be relatively ineffective or uneconomical.

(2) Combat Service Support. The logistical and support missions performed by aviation assets have greatly enhanced the Army's capability to supply and support its combat elements. Standard combat service support missions in combat in cities could be aerial resupply and medical evacuation.

(3) Command and Control. Utilization of aerial platforms for command and control could enhance the commander's capability to maneuver and control his elements within the city.

(4) Communications. Communications in combat in cities will be more difficult due to the line-of-sight restriction of FM radios. Use of aerial radio relay platforms could enhance the tactical communications capability of elements within built-up areas.

(5) Intelligence. Standard aerial reconnaissance of the built-up area could play an important role in the planning and execution of combat in cities' missions.

(6) Offense. The attack of a built-up area is normally divided into three phases:

(a) Phase I. Isolation of the objective area or, at a minimum, the seizure of positions outside the built-up area from which the attack can be supported.

(b) Phase II. Advance to the edge of the objective area and seizure of a foothold.

(c) Phase III. Advance through the built-up area and destruction of enemy forces.

Phases I and II are described in FM 31-50 (now FM 90-10) as being standard offensive operations and for airmobile planning could probably be treated as such. Phase III would probably be the most difficult part of the operation. Airmobile forces could play a very important role in the accomplishment of this phase.

Aviation assets could be employed to move small combat elements from building to building as necessary. Utilizing the helicopter to place combat elements on rooftops, attacking forces could have the advantage of fighting down, rather than up. Reinforcement of combat elements could also be enhanced by use of aviation. Coordinated attacks using ground mobile forces and airmobile forces could be a successful tactic.

(7) Defense. Current doctrine for defense of a city prescribes an area defense. Since the disposition of defensive forces should already be accomplished before an attack starts, the major roles of airmobility could be the movement of highly mobile reserve forces and the placement of airmobile forces outside the city on key terrain features or high speed avenues of approach to delay and harass the approaching enemy forces.

CONCLUSIONS

a. In the offensive role of combat in cities, airmobility can be employed to advantage, particularly in Phase III of the attack.

b. In the defensive posture, airmobility could be used to deploy the reserve element and to move forces outside the built-up area to engage the approaching enemy forces.

c. In many cases, the aerial weapons platform might be more effective than conventional artillery support.

d. The use of aviation assets in combat service support functions would remain unchanged from other types of combat.

e. Communications aspects of combat in cities could be enhanced by the use of aerial platforms as communications relay stations.

RECOMMENDATIONS

That current doctrine on combat in cities be reviewed to include the aerial weapons platform as a major source of combat firepower.

The final study groups' recommendations were utilized by CACDA (Combined Arms Center Development Activity) in drafting up the current FM 90-10 Military Operations on Urbanized Terrain (MOUT). This most current How-To-Fight manual on MOUT does address Army Aviation support; however, its treatise on the use of aviation is keyed to the enemy air situation, enemy air defense capabilities, terrain characteristics within and adjacent to the built-up areas, and the availability of Army or Air Force suppression means. 13/

Chapter Two of this thesis will describe the threat which faces Army Aviation in MOUT. The typical ADA threat has limitations imposed on it by the conditions in urbanized terrain and some normally lesser threats are more potent due to the environment. After a discussion of the threat, Chapter Three will then discuss the current helicopter force, what its capabilities are, and what developments are in progress to further improve on these

capabilities. Chapter Four will then depict a scenario in which an air assau. , is made deep into enemy territory to capture an urban complex and the river crossings therein. This air assault force then must defend its prize until link-up is made. The final chapter summarizes the rationale used in the development of this thesis: that aviation can survive while assisting the MOUT commander, and that aviation offers the best means for mobility, firepower, and sustainability.

CHAPTER I

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CHAPTER II

THREAT

When considering the threat posed by Warsaw Pact forces, one must consider the pervasive umbrella of air defense the U.S.S.R. has established to support their combined arms team. Since this is considered the most serious threat to Army Aviation in support of the combined arms team, I will discuss the capabilities and limitations of the U.S.S.R./Warsaw Pact force's air defense systems within the context of this thesis, i.e., in a MOUT environment.

Army Aviation became a maneuver element during the Vietnam conflict. The Soviets observed our use of helicopters and close air support in concert with, or as a substitute for, ground combat operations and set about developing an overlapping air defense with redundant weapon systems to the point where "in the event of war, a maneuver enemy could not count on tactical air support". 1/

Small arms have proven effective against low flying aircraft and helicopters in both World Wars, Korea, Vietnam, the Mideast Wars of 1967 and 1973 and the Soviet's own incursion into Afghanistan in 1981. Thus the Soviet air defense system starts with the individual soldier.

Within each motorized rifle company, a platoon is designated to provide immediate fire support against attacking aircraft. All Soviet soldiers are trained in hostile aircraft recognition and in antiaircraft firing techniques. They are trained to be especially watchful for aircraft operating at nap-of-the-earth (NOE) and to take immediate action against this threat, since the reaction time is so limited. A typical Motorized Rifle Battalion, reinforced by one tank company, would have the following small arms for use against aircraft: 346-7.62mm AKM rifles, 57-7.62mm PK light machine guns (BMP), 45-7.62mm COAX machine guns (BMP, tank), 13-12.7mm heavy machine guns (tank), and one or more 14.5mm heavy machine gun/s (BRDM). 2/ The cover and concealment that MOUT operations afford to the individual soldier make him the greatest threat facing helicopter operations in the urban complex.

The threat posed by antitank weapons and the tank's main gun must not be overlooked. Regarding the former, the RPG-7 AT grenade launcher is an excellent example; a 40mm, shoulder-fired, reloadable grenade launcher that is also capable of firing the 85mm HEAT round. The RPG-7 is simple, effective, inexpensive and was used against helicopters with some success in Vietnam. 3/ The RPG-7 is found in each squad and would be plentiful during MOUT operations. Reaction time of the soldier would be the greatest limiting factor to the use of the RPG-7 against

helicopters engaged in NOE flight, however, "anti-helicopter ambushes" are conceivable in MOUT. The RPG-7 would be a good "field expedient" in this role. A tank's main gun could become a significant threat to helicopters flying NOE "at street level" - provided the tank had the room to traverse and hence track the target. Most helicopters will be flying NOE "at roof level"; however, and a tank would probably not be able to elevate and traverse in a timely manner. Tanks could also be used to ambush landing zones.

The next family of weapons systems that comprises a threat to helicopters in MOUT operations is the Anti-Aircraft Artillery (AAA) weapons. Capable of being used to support either ground or air defense missions, these weapons include: the ZPU-4 -- a quad 14.5mm machine gun, the ZU-23 -- a twin-barreled 23mm gun, and the S-60 -- a 57mm gun. 4/ All of these AAA weapons are trailer mounted and lack the mobility necessary to support today's Soviet regiments. Hence, their use will probably be confined to rear area protection. The Soviets do possess two self-propelled AAA systems - the ZSU-57-2 (57mm) and the ZSU-23-4. The ZSU-57-2 has a twin-barreled 57mm AA gun with a range of 4,000 meters. Its armor protection permits it to be employed with the forward maneuver elements of the Tank and Motorized Rifle Divisions. It has a less sophisticated optical-mechanical computing sight. 5/ The

ZSU-57-2 is probably being phased out at the regimental level by the ZSU-23-4.

The ZSU-23-4 system consists of four 23mm guns and a gundish radar, mounted on a lightly armored tracked vehicle. The gundish radar is extremely effective at tracking aircraft operating at low altitudes, and it possesses a narrow beam difficult to evade or detect. 6/ The system has an effective range of 3,000 meters, and each of the four barrels has a cyclic rate of fire capable of 1,000 rounds per minute. The sustained rate of fire is 200 rounds per minute. The ZSU-23-4 is also capable of being fired electro-optically (where radar provides range information only) and optically. 7/ It is a very effective weapon and a definite threat to helicopters in a MOUT environment. However, the ZSU-23-4 does have limitations; it is susceptible to electronic countermeasures. The radar and the thin armor are vulnerable to a variety of weapons. Our attack helicopters also have the capability to stand off beyond the effective range of the ZSU-23-4 and use 2.75 inch rockets, TOWs, or Hellfire to defeat it. This stand-off probably won't be employed in most MOUT situations. In MOUT, the most effective active countermeasure that can be taken against the ZSU-23-4 is to minimize exposure time. The radar takes time to acquire the target, feedback the range information, look on with the gun systems and then engage the target. This time span is much larger

than one would imagine. A general guideline for operations against a ZSU-23-4 2500 meters away is not more than 37 seconds exposure time from unmasking to remasking. 8/ I will discuss the other countermeasures later in this chapter. An advantage we will have during MOUT operations is that the buildings will create considerable ground clutter that will significantly degrade the effectiveness of all radars (as well as communications equipment). To my knowledge, the gundish radar of the ZSU-23-4 has not been tested in a MOUT environment by the U.S. to determine the exact effects of ground clutter. I feel certain, however, that the Soviets will limit their employment of the ZSU-23-4 to the outer edges of a built-up area so it can use its radar in the most effective mode of operation, i.e., the mode which gives it the highest probability of hit (PH).

The Surface-to-Air Missile (SAM) presents the most sophisticated threat to helicopters in MOUT operations -- yet at the same time the SAMs are less of a real threat than the AAA or the individual/crew-served weapon previously discussed. There are four categories of SAM systems. 9/ The high-to-medium altitude air defense (HIMAD) weapons include the SA-2 GUIDELINE and SA-4 GANEF, which present a threat only if you operate at altitudes of 1,000 ft. or greater, hence these systems will not be discussed further in this thesis. The low-to-medium altitude air defense (LOMAD) weapons include the SA-3 GOA, and the SA-6 GAINFUL.

The SA-6 is deployed with maneuver divisions, while the SA-3 supports rear area protection plans. The SA-6 has long been considered a significant threat to Army Aviation because of its sophisticated radio command guidance and semi-active radar terminal homing. I agree with those who doubt the real threat posed by a system which has a minimum effective altitude of 100 meters (considerably above the height of a helicopter at NOE). Nor is it very likely that the Soviets will fire a two-stage missile more than 19 feet long, with a 125 pound warhead, at a helicopter. 10/ The short-range air defense (SHORAD) missiles include the SA-8 GECKO and the SA-9 GASKIN. According to FM 90-1: "These weapons represent a very serious threat to Army Aircraft". 11/

The SA-8 is an improvement over the SA-6, in that it has its own onboard LAND ROLL target acquisition and fire control radar. It has a minimum effective altitude of 50 meters (150 ft.), however, which gives it a limited capability to acquire helicopters hovering at NOE. 12/ The SA-9 is a passive, infrared missile system normally employed in conjunction with the ZSU-23-4. The SA-9 lacks radar, and therefore usually depends on the ZSU's radar for information regarding possible targets until they are visually acquired. 13/ The SA-9, like the SA-6 and SA-8, has a minimum engagement altitude. In the case of the SA-9, however, this minimum engagement altitude is only 20 meters (approx. 60 feet). While most helicopter operations at NOE

levels are below this height, helicopters flying NOE in MOUT will probably be operating normally at 20-30 meters -- just above the level of single story buildings and telephone/power lines. Therefore the SA-9 presents more of a threat to helicopters during MOUT operations than during normal tactical operations.

The man-portable missile systems (MANPAD) are the final SAM weapon systems and the most abundant. The SA-7 GRAIL is a man-portable, shoulder fired, low altitude, surface-to-air missile quite similar to our own Redeye/ Stinger. The improved SA-7B has a slant range of 4,800 meters and, like the SA-9, is dependent on the ability to lock onto a heat source for guidance. One SA-7 is normally found within each platoon, or 120 per Motorized Rifle Division. A limitation normally not considered about the SA-7 is its minimum engagement altitude of 45 meters (approximately 135 feet). This means that the SA-7, like the SA-8, is severely limited in its ability to engage helicopters operating at NOE altitudes.

In recognition of the formidable array of anti-aircraft weapons available to the Soviet commander, the United States has, since 1971, made a tremendous effort in developing Aircraft Survivability Equipment (ASE). Funding for the ASE program during the period FY 72-FY 81 was over $321.2 million. For FY 82-FY 86, the planned ASE budget is approximately $553.5 million. 14/

ASE Systems already fielded include both active and passive countermeasures designed to provide early warning, avoid detection, and enhance crew/aircraft survivability.

Passive countermeasures include signature reduction measures such as low reflective infrared (IR) paint, a flat plate canopy and flume suppressors, which deflect the hot exhaust gases upwards. These measures not only reduce the initial detectability of the aircraft, they also degrade the ability of systems that depend on infrared guidance to acquire, track, and lock onto a target. Future signature reduction efforts include a Hover IR Suppressor System being designed for the UH-60 Black Hawk to reduce both hot metal and plume IR emissions 15/, and a low flicker rotor for the AA-64 Apache that will make it harder to acquire visually.

Another passive countermeasure in production is the AN/APR-39 Radar Warning Receiver. It warns the pilot that he is being engaged by a threat weapons system and acts as a target locator by providing a relative bearing to the threat. An improved version of the AN/APR-39 is currently under development. This new version uses a digital processor and an alphanumeric display to tell the pilot what the threat is and what mode it is in, i.e., acquiring, tracking, or locked on. 16/ (Author's Note: With the current Radar Warning Receiver the pilot must distinguish aurally the tone produced by the receiver and

determine if that radar is the radar associated with a threat weapon, say a ZSU-23-4, or if that radar is from a ground surveillance radar set like the AN/PPS 5. This means that our aviators currently need audio training so they can differentiate tones produced by various radars in order to effectively use the current AN/APR-39 in combat. Additional passive countermeasures under development include the AN/AVR-2 Laser Warning Receiver that will receive, process, and display information resulting from aircraft illumination by lasers, and the AN/ALQ-156 Radar Missile Detector that informs the crew that a missile has been fired towards them. 17/

The last passive countermeasure with a direct application for helicopters in a MOUT environment is the increased ballistic tolerance that is being designed into the new "family" of helicopters. The AH-64, for example, will be invulnerable to 12.7mm rounds and will have low vulnerability to 23mm HEI rounds. Additionally, the main gearbox is designed to operate for one hour without oil, and new composite rotor blades are being developed that will offer protection for projectiles larger than 23mm. 18/

Active ASE countermeasures are also being developed to enhance the mission capabilities of army aviation. One such example is the M130 Chaff/Flare Dispenser. This ASE product produces a decoy that aviators will be able to use to deceive radar guided or IR missile systems. The Chaff is dropped when the Radar Warning Receiver (AN/APR-39)

indicates probes from a threat radar, to present a "more desirable" target for the radar to lock onto while the helicopter repositions itself. The flare is fired when a missile approach detector (AN/ALQ-156) is activated. This flare provides a greater heat signature for the IR missile to home in on, thus permitting the helicopter to reposition itself. 19/

Another category of active countermeasures is the family of jammers under development. Jammers will probably present the most significant enhancement for the survivability of helicopters. They function automatically to introduce errors into the guidance or tracking systems of the infrared tracking or radar directed threat systems. This means that an IR missile will miss by a significant distance, and that the radar modes of engagement on weapons such as the ZSU-23-4 will not be able to track and lock onto the target, thereby forcing the operators to use their alternate optic sights. 20/ These jammers include the AN/ALQ-136 Radar Jammer, the AN/ALQ-144 IR Jammer, the AN/ALQ-147A IR Jammer (which has already been fielded) and the AN/ALQ-162(V) Continuous Wave (CW) Radar Jammer. The concurrent use of aircraft survivability equipment, together with the prudent use of NOE flight techniques to minimize exposure time and mask the helicopter's movements, will enable army aviation to be employed successfully against the Soviet air defense umbrella. There remain, however, three additional threats to be considered.

The first threat is one that Soviet open source literature indicates might become the most effective anti-helicopter weapon -- the MI-24 HIND series of attack helicopters. 21/ The HIND A,D, & E are equipped with either a 12.7mm or a 23mm Gatling Gun, 128-57mm rockets, and four anti-tank guided missiles. The HIND was designed and is being employed as an offensive weapon. Its maneuverability and firepower will undoubtedly be used to support Soviet operations. It is very likely, therefore, that U.S. helicopters supporting MOUT operations will find themselves fighting the HIND. Therefore we must consider this threat and be prepared to deal with it. This may require arming our scout and attack helicopters with a lightweight air-to-air missile to be used solely as a defensive measure. Work is currently being done on the use of the Stinger in an air-to-air role by the Self-Protect Air-to-Air Missile Concept Evaluation Program (SAMCEP). 22/

The next threat to our employment of aviation is that posed by indirect artillery fires. During NOE flight, helicopters lose the performance safety parameters of airspeed and altitude which make them impossible targets for artillery fires. At NOE, to survive the sophisticated air defense array, the helicopter takes on the characteristics of a more conventional ground target. If a telltale sign of dust from the rotor wash, or a momentary flicker from the blades, indicates that helicopters might be hovering

masked behind a building, a forward observer could quickly call and adjust preplanned artillery, using airbursts to destroy the helicopter threat. Because of such a threat, our aviators must become even more cautious in the performance of their daytime missions during MOUT. A program under development that would ease the dangers and preclude a helicopter from revealing its position is the Mast-mounted sighting system. The Mast-mounted sight protrudes above the rotor system and will permit a helicopter to remain completely masked except for the sight, which is approximately the size of a basketball on top of a baseball bat.

The final threat posed to helicopters during MOUT operations is the one which some aviators seem to fear the most -- wire strikes. In an urban area, wires are found along streets, railroads, between structures and on top of most buildings. However, the problems posed by wires are not unique to the urban environment. Wires became a problem for rotary wing operations with the advent of the Nap-of-the-Earth (NOE) flight, since NOE is necessary to survive in a modern threat environment. During the period 1 January 1974 to 1 January 1980, 8 percent of all Army aircraft damaged and 16 percent of all Army aircraft fatalities were attributable to wire strikes. 23/ Such losses during a peacetime environment caused the U.S. to look for an immediate solution. The Canadian National Defense Headquarters (NDHQ) had a wire strike protection

concept conceived by Bristol Aerospace Limited (BAL) that was qualified for application to Canadian OH-58A's in May 1979. This concept, known as the Wire Strike Protection System (WSPS) was modified to protect the skid gear as well as the main rotor system and is a planned Product Improvement Program (PIPS) for the OH-58, UH-1 and AH-1 series helicopters. The WSPS is a cutter/deflector system with an upper cutter to protect the main rotor, a lower cutter to protect the skid gear; and a windshield center-post deflector to strengthen the windshield and deflect wires to the upper cutter. The WSPS has successfully cut high tensile (11,000 pount) steel wires up to 3/8 inch in diameter. 24/ This system is not a panacea and research efforts are ongoing to produce an effective wire warning system to further support the helicopter in the performance of its mission.

This chapter addressed the most common threats a helicopter operating in a MOUT environment will encounter. It exposed the reader to some of the most significant developments underway to further enhance the helicopter's capability to operate in MOUT. The next chapter will address the specific missions each type of helicopter (i.e., scout, attack, utility) can perform and how those missions can benefit the commander in his MOUT efforts.

CHAPTER II

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CHAPTER III

TYPES OF HELICOPTERS: THEIR TASKS IN MOUT

This chapter examines the contributions made to MOUT by the elements of the Combined Arms Aviation Team -- light observation helicopters, attack helicopters and utility helicopters. It provides examples of how their tasks can be accomplished in a MOUT environment and explains some of the benefits afforded the ground commander.

Included among the light observation helicopters, for the purpose of this thesis, are the OH-58C KIOWA, which is the Army's current scout helicopter, the Army Helicopter Improvement Program (AHIP)/Near Term Scout Helicopter (NTSH), and the Advanced Scout Helicopter (ASH), which is still in the design stage. The OH-58C KIOWA light observation helicopter (LOH) has performed a myriad of tasks since its introduction in Vietnam during the Mid-60's. It is capable of carrying three passengers in addition to a pilot and co-pilot. Since the LOH is more economical to operate, it has performed in a taxi service/courier role on many occasions. Its primary mission during Vietnam, however, was to perform reconnaissance missions and find Viet Cong positions. It was a common occurrence for LOH's to recon

by fire in an attempt to get the Viet Cong to return fire. The LOH would then call for artillery, tac air, or helicopter gun ship support to hit the VC position. As the Viet Cong became more adept in air defense techniques and equipment, the LOH started teaming up with gun ships from his unit, both for self-protection and to hit the Viet Cong before they disappeared. From these early (pre-1970) practices grew the hunter-killer team concept of three LOH's paired with five attack helicopters used to locate and destroy an enemy force.

In a MOUT environment on today's battlefield, the OH-58C's primary mission is still one of reconnaissance. The scout in his OH-58 will screen the periphery to warn of the enemy's attempt to conduct link up operations or re-supply. Then he will adjust field artillery or vector in attack helicopters to defeat new threats as they present themselves. Within the city proper, the OH-58 will permit the scout pilot to reconnoiter the enemy's position and determine if there are gaps apparent (regardless of the type of ongoing operations, i.e., offense or defense, the assistance provided by helicopters is the same unless so stated). After locating possible exploitable areas, the OH-58 would identify multiple air assault routes into the area and note the presence of key terrain and obstacles along these routes. During the assault, OH-58's lead the way on each route, identifying sniper positions and directing Suppression of Enemy Air Defense (SEAD) missions by

Attack Helicopter, Artillery and TAC AIR. It is also possible that OH-58's will be the commander's primary means of transportation/command and control on the battlefield in a MOUT situation. The LOH gives a commander a highly mobile means to keep in touch with the current situation. If the commander cannot contact one of his units on the radio, he can quickly reposition himself with the OH-58 and stay abreast of the tactical situation in a fluid environment. During more static conditions, retransmission sites can be emplaced quickly and accurately by the OH-58. As the tempo of the battle unfolds, variations range from the retrans station staying on board while the A/C either lands and shuts down, continues to run at flight idle, or remains airborne.

The arrival of the near term scout helicopter (AHIP/NTSH) will permit expanding the role of the LOH beyond reconnaissance, command and control and radio relay. The AHIP/NTSH is an OH-58C with an improved hover capability and a mast mounted sight for day and night target acquisition. It will also be equipped with a Doppler navigation system for fast, accurate position references. 1/ The mast mounted sight will not only permit the OH-58 to remain completely masked while making its reconnaissance day or night and under all weather conditions, but the sight also has a laser range finder/designator. This will permit the AHIP/NTSH to designate targets for HELLFIRE

missiles and COPPERHEAD artillery rounds, in addition to designating targets for the Air Force's "Smart Bombs."

Other missions remain possible for the present, near term, and future versions of the LOH. Garbled communications during MOUT operations will probably result in a greater reliance on wire, especially for the defenders. An LOH could easily be rigged to lay wire, either across the buildings "as the crow flies" to economize, or drape it with existing lines across utility poles to conceal our communication means and terminals. The Berlin Brigade was using the OH-58 for laying WD-1 commo wire in their MOUT facility in 1977.

Another possible mission for the LOH in a MOUT environment is the removal of wire obstacles. Such a task would definitely be feasible if the built-up area was being defended by U.S. forces and the utilization of the MOUT terrain was planned for properly. In such a situation, key obstacles and routes would be identified and obstacles to helicopters removed to permit ingress and egress. Many of these wire obstacles could no doubt be removed by individual soldiers properly equipped, however, the magnitude of such a task would create a drain on manpower that could better be used elsewhere in preparation for future operations. An OH-58 (or its predecessors) equipped with its wire cutting device could fly the routes and selectively remove wires that impede our use of the terrain. It seems likely that a wire cutting device could be fashioned on

the belly of the OH-58. This could be retractable and, when extended perpendicular to the aircraft wires, would be deflected into a passive cutting device. The advantage of this is that the rotor system would not be endangered if a wire slipped off the deflectors. The whole device could be fastened with an explosive bolt similar to the one used on the cargo hook of the CH-47, so that the pilot could jetison the wire cutter if mechanical problems were encountered. No Required Operational Concept (ROC) has been formulated to outline such a task for our scout helicopters and this thesis does not imply that therein lies the solution to wire hazards in a MOUT environment. This is an illustrative example of how our scout helicopters can prove useful to the MOUT commander.

Another task the scout helicopter can perform for the MOUT commander is that of crowd control. Control of the civilian populace will be an important consideration during all MOUT operations. External loudspeakers built into the LOH would greatly reduce the problems inherent in crowd control. This capability would be useful in any civil disturbance and would also provide an immediate form of communication to the troops if radios and/or the chain of command became ineffectual.

An issue that has been argued back and forth for several years should be re-examined with MOUT operations in mind. That issue is whether or not to arm the scout helicopter. In Vietnam, many scout pilots behaved as

though they were attack helicopter pilots and tried to destroy any sources that returned fire. This eventually resulted in our LOH's being disarmed, as many would say, to preclude them from being too bold during their reconnaissance. Nevertheless, today's enemy air defense systems, together with the air-to-air threat which the HIND imposes 2/ and, the snipers and anti-helicopter ambushes that will be commonplace during MOUT, dictate that the LOH's have some means to return fire. Even if it is nothing more than a 5.56mm mini-gun, it will "keep their heads down" and provide a few precious seconds in which to seek cover by remasking.

The final task that the scout helicopter may have to perform in a MOUT environment is that of a decoy. By purposely exposing all or part of his LOH for brief periods of time, the scout could divert the attention of air defense assets while another LOH designates the target for a SEAD mission, or an attack helicopter unmasks and quickly fires a pair of 2.75" rockets, crippling or destroying the target. This use of the LOH is probably more necessary today without the mast mounted sight and improved ballistic tolerances, which are present in near term and future helicopters.

The next member of the combined arms aviation team is the utility helicopter. Represented by the UH-1 Iroquois and the relatively new UH-60 Blackhawk, the utility helicopter will be an important member of the combined efforts

of army aviation in MOUT operations. Prior to discussing the missions these aircraft will perform in support of MOUT operations, it is necessary to address their inherent capabilities.

The UH-1H helicopter is an uprated version of the UH-1 series that has been in service to the U.S. Army since 1960. Normal missions permit the UH-1H to carry eight combat loaded soldiers internally, or 3,000 lbs. of cargo may be sling loaded externally. These combat loads are dependent on temperature and altitude conditions. The UH-60A, on the other hand, can lift a fully combat-equipped, eleven-man infantry squad under conditions encountered in the majority of theaters, e.g., 95°F and 4,000 ft. 3/ Externally, the UH-60A can lift 4,000 lbs. while transporting six soldiers internally. This permits the UH-60 to transport a 105mm Howitzer (Towed) with its crew and a segment of its basic load of ammunition.

Both the UH-1H and the UH-60A have IR (infrared) suppression systems designed to increase their survivability on the battlefield. Additionally, the UH-60A is invulnerable to 7.62mm AP (armor piercing) rounds, and it can fly for at least 30 minutes after sustaining ballistic damage from 23mm HEI, even if the main transmission is completely drained of oil. The UH-60's noise signature is lower than that of the UH-1, enabling the UH-60A to remain less detectable. 4/

The primary missions for utility helicopters during MOUT include troop movement, resupply, and medevac. MOUT operations require the commander to possess the capability of rapidly moving troops to capture, almost simultaneously, the key terrain features within that particular MOUT area of operations, or to reposition forces to counter the enemy's scheme of maneuver. The utility helicopter gives the ground commander the ability to reposition a squad, a TOW or a DRAGON team, or a whole company to almost anywhere he needs them in the city. The utility helicopter affords the commander access to the rooftops so that he may gain the advantages of observation and fields of fire. The roof also permits the unit to capture the building complex by fighting down the staircases, which is less fatiguing and therefore should result in fewer casualties for any given building. Not all rooftops are capable of supporting the weight of a helicopter; in fact, most of them are not. Without prior knowledge of the roof structure, the only buildings helicopters should land on are the concrete slab buildings commonly used for parking garages, schools, and factories. 5/ This factor will require the Hueys or Blackhawks to come to a low hover so that the troops may safely jump out. If the roof is too littered with antennas and wires for a low hover, the troops will rappel from the helicopter to the rooftop.

MOUT operations are extremely costly in terms of ammunition expenditures, and the utility helicopters will

provide the bulk of the work in keeping the unit resupplied. If a brigade or larger size unit is performing the MOUT operations, then a forward area rearm and refuel point (FARRP) will probably be established so that aviation can provide the maximum assistance. The utility helicopter will keep this FARRP supplied. If the area for MOUT operations is beyond the range of conventional artillery, it is conceivable that the utility helicopter will sling load in towed 105mm pieces and keep them resupplied during the operation.

The casualty rate can be expected to double or even triple during MOUT operations. The UH-1 and UH-60 will perform the majority of medevac for the MOUT force. By landing in secured LZs where the wounded have been transported for evacuation, or by landing behind a building with fighting going on less than 100 meters away, the UH-60 evacuation aircraft can evacuate up to six litter patients at a time. The doors of the UH-60 cannot be closed with a standard U.S. litter on the floor, however, because the door is too narrow at the bottom. The NATO standard litter has telescoping handles and may be used, but the U.S. does not have this litter. Instead of modifying/replacing the U.S. litter, the Health Services Command has proposed an electro-hydraulic "lazy susan" litter rack which rotates each litter into the aircraft so that it is parallel with the aircraft and the door may be closed. 6/ This fix

appears to be complex, costly, and some time in materializing. Therefore, the utilization of the UH-60 Blackhawk for medevac will be limited to non-litter patients by the MOUT commander.

Utility aircraft will also provide the MOUT commander a sophisticated intelligence gathering and target acquisition platform. Both the SOTAS (Standoff Target Acquisition System) and the QUICKFIX (communications intercept/jammer) are systems currently using the UH-1 for a platform. The UH-60 is being modified to accept both of these systems. Though these systems will be affected somewhat by the clutter presented by urban structures, they will still provide the MOUT commander with intelligence concerning the enemy unit within the city and/or units outside the city but within the area of interest to the MOUT commander. (Author's note: For MOUT operations, the commander's area of influence is limited to the range of his direct and indirect fire weapons. His area of interest remains the same regardless of the fact that he is involved in MOUT operations.)

The medium lift helicopter (NLH), represented by the CH-47 Chinook, handles the bulk resupply effort necessary for the ground commander to bring in the equipment and personnel necessary for MOUT. The Army's Required Operational Capability (ROC) for the CH-47 is to lift 15,000 lbs., climb at 200 ft./min., fly a 30 nautical mile radius mission and return with 30 min. fuel reserve at

4,000 ft. and 95°F. In 1981, less than 1/3 of the CH-47 fleet could meet this ROC. 7/ Today, all CH-47's are being converted to the new stretched CH-47D. The CH-47D with its new engines, transmissions, rotor blades, and multi-cargo hook system can haul more and get it there faster. The Medical Unit, Self-Contained, Transportable (MUST) hospital unit can be carried by the CH-47D at air speeds up to three times faster than before. 8/ The CH-47D can provide the MOUT commander with the new M198 155mm Towed Howitzer. The new engineer combat vehicle will also be transportable by the CH-47D. Besides providing the MOUT commander with heavier, more responsive artillery and engineer equipment and providing the bulk of resupplies and replacement personnel, the CH-47 has several specialized missions it is capable of performing.

One such mission is that of the "Mother Cow." The CH-47's load carrying capacity, both volume and weight, suits it to the task of providing support to other helicopters by transporting the Forward Area Rearm and Refuel Point (FARRP). The CH-47 can haul up to five times as much Cl III (fuel) and Cl V (ammunition) internally as the UH-60 can haul externally. This means the CH-47 can perform NOE better than a UH-60 with a sling load and therefore has a higher chance of survival. In the "Mother Cow" configuration, the CH-47 transports the ammunition and fuel internally to the FARRP location. Upon landing, a generator to operate the refueling pumps and ammunition to replenish the

attack helicopter are quickly offloaded. Four refueling hoses from the pump are extended out through the port holes so that two hot refueling points are established on each side of the CH-47. When it is time to displace, the hoist is used to pull the generator and the remaining ammunition back into the aircraft. The 101st Airmobile Division used the CH-47 "Mother Cow" configuration extensively during the mid-70's. They were forced to stop hauling fuel and ammunition internally due to safety restrictions. In a combat situation, these safety restrictions should not preclude this concept from being used. It is more mobile and establishes a FARRP capable of supporting an Attack Helicopter Company while tying up the fewest assets.

If the CH-47 had folding rotor blades, it would be better prepared to perform missions such as that of the "Mother Cow." Folded blades would permit other helicopters to hover closer to the CH-47 and negate the possibility of the CH-47's blades flexing and damaging the airframe because of the rotor wash. Folded blades would also make it easier for the CH-47 to be concealed under cover within the city. The Berlin Brigade has analyzed its urban complex and has identified hangars in garage-like facilities within the city to provide overhead protection and concealment for aircraft in order to maintain its aircraft and keep them concealed when they are not being used. 9/ Folding blades on the CH-47 would add to its capability to remain well forward and support the MOUT commander in a

timely fashion. The CH-47 was originally designed for use by the Marine Corps, and the first versions had folding blades installed. It was subsequently found to be too large an airframe for shipboard operations, so a scaled down version - the CH-46 was adopted by the Marines. When the Army opted for the "full size" CH-47, the folding blades were deleted from the production aircraft.

The last "non-standard" mission to be addressed for the MLH is that of fire-fighting. Within a MOUT environment, fires will be an inevitable result of conflict. Some areas of the city will be too important to allow them to be consumed by fire. They may be important due to historical significance, the presence of a dense civilian populace, or perhaps a forward hospital that cannot be evacuated in time. The CH-47 is the only feasible asset that the MOUT commander can spare to extinguish a fire. This use of the CH-47 requires the absence of an immediate threat in order to succeed, therefore its application would be limited in a MOUT environment. The Air Force's fire fighting helicopter, the Husky, can drop a foam mixture from a bucket to extinguish a burning helicopter. The U.S. Forest Service puts out forest fires in remote areas using CH-47 type helicopters to drop water or foam on the fire. These examples illustrate this task as another mission helicopters can perform for the MOUT commander.

The last type of helicopter which will be found supporting the MOUT commander is the attack helicopter. The attack helicopter available to support MOUT today is the AH-1S Cobra. The Advanced Attack Helicopter (AAH-64) APACHE is currently not scheduled for delivery until November 1983. The capabilities of both aircraft will be examined in gross terms, and tasks suggested for which they are suited in a MOUT environment.

The AH-1S COBRA attack helicopter is a product improvement of the AH-1G and is equipped with TOW missiles, 2.75 inch rockets, and either a 20mm or 30mm turret mounted cannon. The AH-1 series is a derivative of the UH-1 and has been in the Army's inventory since 1965. 10/ The AH-1S has incorporated several aircraft survivability equipment (ASE) features mentioned in Chapter 2; they include: IR suppressors, the ALQ-144 IR Jammer, the AN/APR-39 radar warning receiver, the ALQ-136 radar jammer, a flat plate canopy for optical survivability, and ballistics hardening so that the tailboom and main rotor blades can survive a 23mm round. 11/ The AH-1S also has a laser range finder to maximize the standoff capability of the TOW missile, and instead of the M28 (7.62mm/40mm) turret subsystem found on the AH-1G, the AH-1S has either the M197 20mm gun (effective to 2,000 meters), or the XM230 30mm Chain Gun (effective to 3,000 meters). 12/

The COBRA's effectiveness on the battlefield is still dependent upon visibility. It does not have a night

signting system for the TOW, and its daytime operations are adversely affected by smoke and haze. The AH-1S does not have much growth potential. When the mission required systems, fuel, and ammunition are on board the aircraft, it is close to its maximum design gross weight of 10,000 pounds. 13/

The AH-64A will incorporate the latest ASE systems (discussed in Chapter 2) and provide an around-the-clock tank-killing capability. Its lethality incorporates the HELLFIRE Modular Missile System (HMMS), the improved 2.75 inch rocket with remote fuzing and a 30mm cannon for suppressive fires. Initially, the HELLFIRE missile will be fielded with a laser-guided seeker. Follow on seekers are under development to permit a true fire-and-forget capability for maximum survivability. HELLFIRE has a range in excess of 5,000 meters and can be fired in a variety of modes. It can either be fired in a direct fire mode that requires that the aircraft to remain unmasked until missile impact, or it can be fired indirectly in conjunction with another laser designator that designates the target for the missile while the AH-64 remains masked. The pseudo-direct fire mode is a combination of the direct and indirect fire modes. The missile is launched while the aircraft is masked and then, while the missile is in flight in the general direction of the target, the AH-64 unmasks and designates the target for the missile. This method of firing redúces the exposure time for the aircraft but

requires timely and accurate target handoff coordination between the pilot and gunner. 14/ The suppressive weapons found on both the AH-64 and the AH-1S provide the attack helicopter with a 30mm gun effective against personnel, lightly armored vehicles, and aircraft as well as an improved 2.75 inch rocket with a remote setting capability.

Two types of 2.75 inch rocket warheads are currently capable of being set from within the cockpit to produce the desired results. The first is the M-433 Remote Set Multi-option Fuze, which can be set super quick for close targets or delay. The delay setting can be adjusted either for forest penetration (dependent on tree height in meters), or the delay necessary to achieve penetration through a bunker or building. The other fuze of the remotely set family is the M439 Multi-purpose Sub-munition warhead (MPSM). The M439 MPSM warhead is adjusted in range by 100 meter increments and has even demonstrated a measurement of effectiveness against tanks. 15/ Together, both of these warheads are significant in the use of the 2.75 inch rocket in the MOUT environment by enhancing its limited range and giving it a penetration capability. The articulated pylons on the AH-64, which are designed to permit more accurate firing of the 2.75 without pitch trimming the helicopter, assist it in obtaining a better target intervisibility in MOUT. Thus, when unmasking and firing at a close-in target in the street below, the AH-64 wing stores deflect down in consonance with the sights to

permit target engagement. The AH-1S, on the other hand, must back off to a greater range (dependent upon the range used to boresight the rockets) to engage the target, because the weapons stores are on a rigid pylon.

The attack helicopter support of the MOUT operation begins on the periphery of the MOUT area of operations. Using the maximum range advantage of the anti-tank weapons and rockets, the attack helicopter will attrit the enemy force and compel them to deploy as they advance on the built-up area. If the enemy is defending a city, the attack helicopters, working as a team with the scout helicopters, will prevent the enemy from being resupplied or reinforced. If, however, the U.S. force is conducting offensive operations towards a built-up area, the attack helicopters will use their anti-tank range advantage and destroy the enemy's armored force, which is doctrinally employed on the periphery in the area of our most probable approach.

During an airmobile offensive operation, the attack helicopter will first be used to perform suppression of enemy air defense (SEAD) assets. This includes destroying their attack helicopters. The SEAD mission should have second priority for those attack helicopters supporting the ground commander. The principle threat facing the forces approaching the built-up area is tanks; therefore the attack helicopters must go after them first. Many feel that the enemy's air defense threat must be silenced before

the attack helicopter can do its mission of killing tanks. The attack helicopter, however, specifically the AH-64, has been designed as a tank killer. It possessses sufficient standoff distance and the electronic survival packages to permit it to perform this mission, given a "terrain wise" pilot and a scout to assist in target identification and local security, regardless of the enemy's ADA situation. When SEAD missions are performed, the attack helicopter has both the 30mm gun and the 2.75 inch rockets to use. Both of these systems provide standoff that should be used if possible. Within the city, the 30mm will provide the quickest response to unexpected encounters with the enemy--be it snipers, an SA-7 gunner, or the ZSU-23-4.

For planned SEAD attacks, the 2.75 inch rocket will be used, either with the M-433 multi-option HE warhead (which provides for a super quick mode for close-in targets in the open, or in the delay mode to penetrate buildings where snipers are hiding) or, with the M-439 range adjustable fuze using a flechette or multi-purpose sub-munition warhead. The 30mm gun should be employed when the HIND is encountered. Because the HIND has demonstrated an air-to-air capability, many people are pushing to incorporate missiles such as the Stinger and the Sidewinder onto our attack helicopters to produce a Fighter/Interceptor Helicopter (F/IH). 16/ To incorporate such weapons, a corresponding decrease in current armament must be made, due to both weight limitations and wing stores available. The

30mm Chain Gun should be sufficient to destroy today's helicopters out to its maximum effective range of 3,000 meters. It's already present on the aircraft. Developing a specialized attack helicopter for this task would result in fewer attack helicopters available to support the ground commander.

In addition to killing tanks and defeating the enemy's air defense assets, the attack helicopters will be used to provide point target destruction of enemy pockets of resistance. This inherent mobility and lethality of the attack helicopter will enable it to respond to an enemy threat quickly in spite of the piles of rubble and pill-boxes and machine gun nests confronting the ground forces. It can provide close and accurate supportive fires, thus preventing destruction of an isolated force. For airmobile insertions, the attack helicopters will fly escort, suppressing sniper fire as well as fires from other anti-aircraft weapons enroute to the objective. Upon arrival at the objective, the attack helicopters could "prep" the landing zone (LZ) by fire, thus pre-detonating any anti-helicopter charges. This prep could also blow up obstacles, such as TV antennaes or electrical and telephone wires which might be present, thus facilitating approaches into the LZ area. While the utility aircraft are making their landings, the attack helicopters have again taken cover and masked, ready to respond to new threats as they materialize. As the utility aircraft depart, the attack

helicopters would again provide suppressive coverage, normally on the same routes back out. Using the same routes would depend on the time elapsed, since the initial routes were cleared and the mobility hindrance factors to the enemy in re-establishing the air defense network in those areas.

Other missions which the attack helicopter will be able to perform for the MOUT commander include providing smoke and/or illumination when and where needed, and reconnaissance information. The 2.75 inch rocket has two supporting warheads. One is the Screening Smoke "Wick" warhead, XM-259. This warhead contains ten wicks that stream individually to the ground, providing a continuing source of smoke, thereby creating a very effective smoke screen of about five minutes duration. The illumination warhead (M-257 currently, the XM-262/263 are in development) provides more than a million candle power for two minutes. The drawback to both of these warheads is that they currently have a fixed range of 3,000 meters. Variable range smoke and illumination warheads are under development, but it will probably be another two or three years before they join the remote fuze family of warheads. 17/

The Target Acquisition Designation Sight/Pilot Night Vision Sensor (TADS/PNVS) System found on the AH-64 has a Day Television (DTV) that provides an increased viewing capability during periods of restricted visibility, together with a Forward Looking Infrared (FLIR) sensor

that incorporates thermal technology for night and adverse weather. 18/ With the TADS/PNVS, the attack helicopter will have the capability to perform reconnaissance missions at night and during all weather conditions. Ground reconnaissance methods will be severely hampered in MOUT operations due to the mobility restrictions. The AH-64 on the other hand, will probably find it easier to maneuver at night than during the day (especially in regards to the enemy's anti-air capabilities). No other helicopter will possess these same capabilities until the Advanced Scout Helicopter (ASH) is produced, and it's still on the drawing boards. Therefore the mission of reconnaissance in MOUT during night or adverse weather will naturally fall to that member of the team most capable of performing it - the AH-64.

This chapter has outlined the various capabilities the four types of helicopters possess, especially when considering a MOUT environment. Some tasks mentioned have not been documented in combat nor in simulation. The next chapter depicts a scenario in which the MOUT commander uses all of his aviation assets to accomplish his mission to first seize and then defend a built-up area until link-up is made with his own forces. Many of those "questionable" tasks will be illustrated in this scenario.

CHAPTER III

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CHAPTER IV

AIR ASSAULT IN MOUT

Doctrinal references to Army Aviation in support of MOUT operations provides a general list of tasks and missions for aviation. FM 90-1, Employment of Army Aviation in a High Threat Environment, does provide a tactical situation to illustrate how these tasks will be accomplished. The vignette in FM 90-1 is so replete with caveats however, that the true capability to perform these tasks becomes questionable.

It is not the purpose of this thesis to suggest that helicopters are now invincible. Losses will occur, especially in a MOUT environment. The scenario this chapter depicts is one in which the threat's capabilities and limitations are portrayed against Army Aviation's capabilities and limitations in the support of MOUT operations. The general and special situations for this scenario were modified for this thesis from a scenario originated by the Offense Branch, Department of Tactics, United States Army Command and General Staff College for their use in an individual development course entitled Advanced Offensive Tactics, course number A390. 1/

GENERAL SITUATION:

a. On 2 April 1982, armed forces of the Warsaw Pact (W.P.) launched an attack supported by chemical weapons against NATO forces in the Federal Republic of Germany. NATO, employing tactical nuclear weapons, conducted a successful defense by attriting the lead divisions to such a degree that their attack faltered, and by preventing the commitment of the opposing armies' second echelon divisions. The declaration of a state of national emergency by the Congress of the United States on 21 March greatly facilitated the rapid reinforcement of Europe. The President simultaneously ordered the deployment of CONUS-based divisions and called the Ready Reserve and Standby Reserve to active duty. To provide the transportation assets needed for this deployment, the Civil Reserve Air Fleet (CRAF) with its 209 long range aircraft was activated, as was the Sealift Readiness Program under the Military Sealift Command which includes 218 cargo ships and 103 tankers. 2/

b. After the arrival of the CONUS-based units, NATO forces assumed the offense on 1 May 1982. This offensive was made possible by two major events. First, the failure of the Warsaw Pact forces in achieving a quick victory caused the widespread disintegration of the satellite nations, thus leaving Russia to fight the war virtually unaided. At this point, the Peoples' Republic of China decided to enter the war and attacked the Soviet Union, thereby forcing the Soviets to divert major forces to the

east and fight on two fronts. The Soviet forces in western Europe having been depleted of much of their combat power, were driven back across East Germany and Poland and into the Baltic States and western Russia by NATO forces.

c. Soviet forces have been conducting a series of delay operations and are expected to try to establish a coordinated defense along the Dvina-Dniepr Rivers west of Smolensk. NATO forces are utilizing the traditional invasion routes into western Russia with the Central Army Group (CENTAG) attacking north of the Pripet Marshes to seize Leningrad and Moscow while the Southern Army Group (SOUTHAG) is attacking south of the Pripet Marshes into the Ukraine to seize Stalingrad. Under CENTAG, the 2d (US) Corps is leading the main attack toward Smolensk and Moscow, and the 20th (US) Corps is leading the secondary attack towards Leningrad (see Fig. 1). This scenario focuses on the actions of the 20th Corps.

d. The 20th (US) Corps was successful in attacking across the Dubysa River complex and by the 19th of August is continuing the advance to the Dvina (Daugava) River - the last major water obstacle between them and Leningrad (400 kilometers beyond the Dvina River). The 25th Armor Division, operating on the left flank of the 20th Corps is proceeding against light-to-moderate resistance. Advance elements of the division are along a line from Utena north to Rokiskis (approximately 60 kilometers from


SWEDEN
FINLAND
Lake Ladoga
LENINGRAD
ESTONIA
Lake Peipus
TO ARCHANGEL
Volga
LATVIA
Baltic Sea
Dvina
LITHUANIA
MOSCOW
20 CORPS
SMOLENSK
2 CORPS
RUSSIA
Vistula
Pripet Marshes
WARSAW
LUBLIN
POLAND
Don
STALINGRAD
KIEV
KHARKOV
Dniepr
LWOW
UKRAINE
Volga
HUNGARY
MOLDAVIA
ODESSA
0 Miles 300
0 Kilometers 400
Danube
RUMANIA
Black Sea

Figure 1.

Daugavpils). The main body is advancing toward Anyksciai (see Figure 2, item 1).

e. At 191300 August 1982, the Commanding General, CENTAG, directs the 20th Corps to execute immediate actions to seize and secure a bridgehead at Daugavpils (Dvinsk) (Figure 2, item 2) to facilitate future operations. The 20th Corps is to be prepared to continue the attack to the east or to execute attacks to the northwest to cut off Soviet forces in their zone.

f. The 1st Brigade, 47th Air Assault (AASLT) Division is in CENTAG reserve and can be released to 20th Corps on request. NATO forces still retain general air superiority, however, enemy air sorties appear to be increasing against CENTAG forces.

g. The Corps Commander tasks the 25th Armor Division with securing the Daugavpils bridges by 201500 August. The 25th Armor Division Commander requests and receives operational control of the 1st Bde, 47th AASLT Div., and an aviation group for this mission. (See Figure 3 for organization of the Bde. and aviation group).

Prior to going further into the scenario, it would be helpful to highlight the German/Soviet battle for this town in W.W. II, analyze the town for its "MOUT characteristics" and then postulate how it will be defended against an air assault.

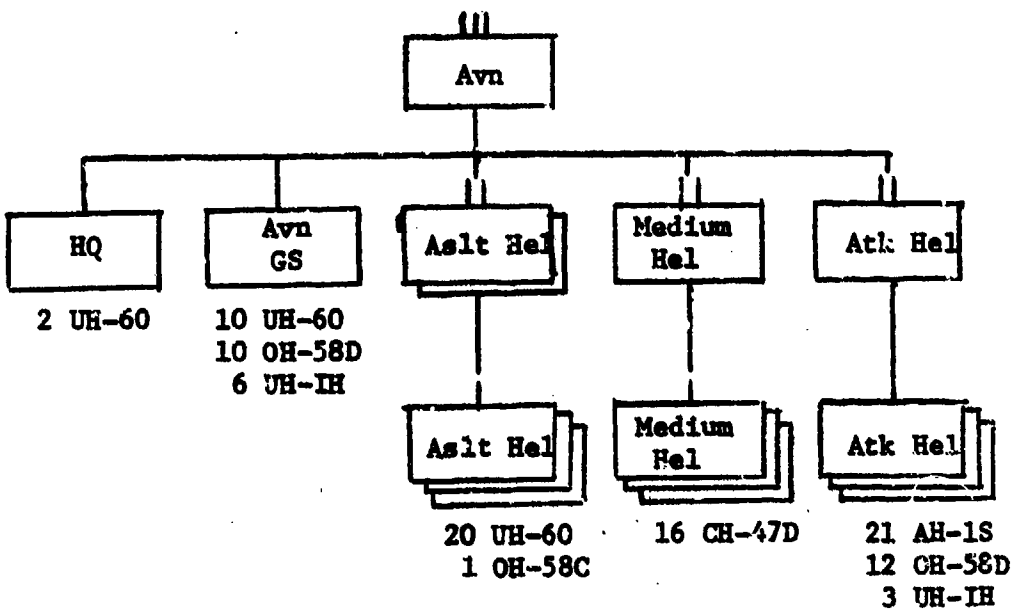
In June 1941, the 8th Panzer Division which was part of Army Group North, had been successful in taking


Baltic Sea
RIGA
DVINA R.
JEKABPILS
LITHUANIA
DAUGAVPILS
ROKISKIS
SIAULIAI
NEVEZIS R.
ANYKSCIAI
UTENA
SODUVE
DUBYSA R.
KELME
BAISOGOLA
PAKEL'VZYS
SESUVE R.
SKAUDVILE
RASEINIAI
AIROGOLA
KEDUNIAI
ERZVILKAS
TAURAGE
KAUNAS
MEMUNAS R.
Area of Operations

Figure 2.

Organization of 1st Bde, 47th AASLT Div

1st Bde, 47th AASLT Div
- 1st Bn (ASSLT), 182d Inf
- 1st Bn (AASLT), 183d Inf
- 1st Bn (ASSLT), 184th Inf
- 1st Bn (105, Towed), 61st FA
- Btry A, 1st Bn (Vulc, Towed), 443d ADA
- Co A, 47th Engr Bn
- 47th Avn Gp (-)
  - Co A, 47th Atk Hel Bn
  - 155th Aslt Hel Bn
  - Co A, 156th Aslt Hel Bn
  - Co A, 165th Medium Trans Hel Bn
  - Co B, 165th Medium Trans Hel Bn



Availability

UH-60 - 75 percent
AH-1S - 76 percent
CH-47D - 65 percent

(AR 95-30)

Figure 3.

the Russians completely by surprise and in the face of sporadic and constantly diminishing enemy resistance, found themselves on 24 June in the village of Smelyne on the Lithuanian-Latvian border, 12 miles southwest of Dvinsk (Daugavpils). The Division's immediate objective was the city of Dvinsk on the north bank of the Dvina River (see Figure 4). To capture this city, however, the Division first had to seize two bridges spanning the river, which was approximately 250 yards wide in this area. Air reconnaissance had indicated that the Russians intended to defend Dvinsk and that both bridges across the Dvina had been prepared for demolition. To preclude delaying the Division's momentum, both bridges would have to be seized in a surprise raid before the Russians could destroy them. The Division Commander therefore issued the following verbal order:

> One platoon of Company C, divided into four assault detachments, will launch a surprise attack against the two bridges at Dvinsk. The detachments will jump off at 0130 on 25 June and head for the bridges in the four Russian trucks that the division captured earlier today. The Russians must be led to believe that the trucks are friendly, so that the assault detachments can get within striking distance of the bridges without being challenged.
>
> Once the detachments have reached the bridges, they will immediately cut all cables leading to the bridges from both banks to prevent the enemy from setting off the demolition charges electrically, cut all detonating cords leading to the charges, and defend the bridges against Russian counterattacks.

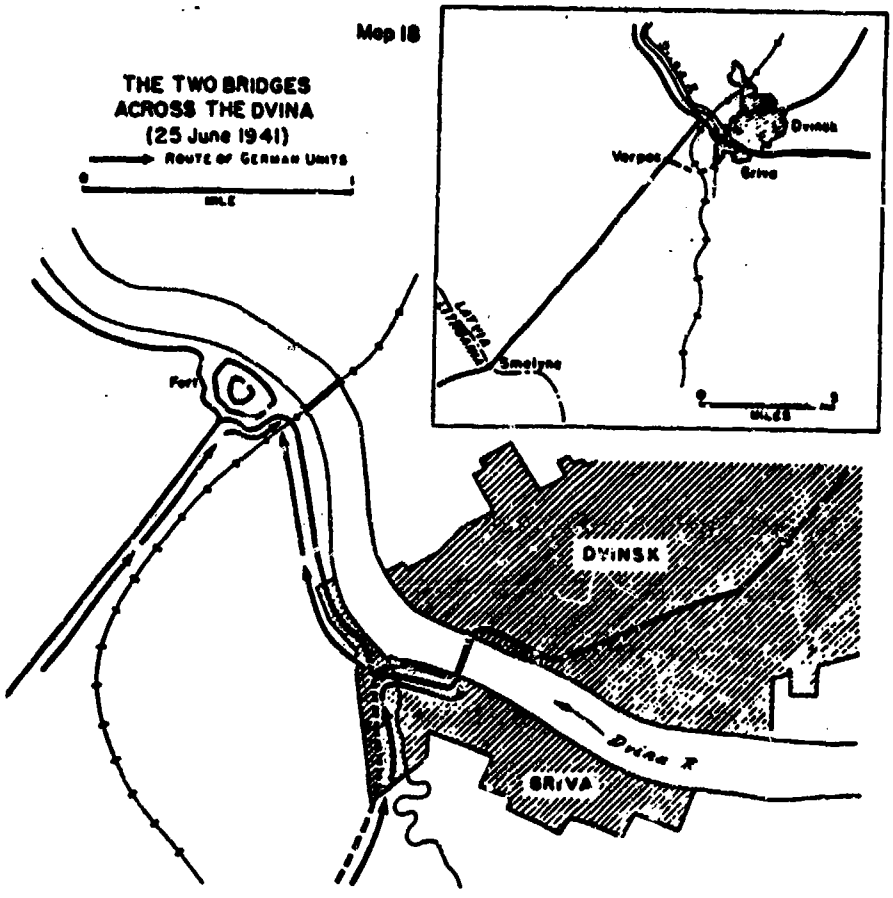


Figure 4. German W.W.II Attack of Daugavpils

> The main body of Company C will also jump off at 0130, but will proceed somewhat more slowly so as to arrive at the bridges about 15 minutes after the assault detachments, which it will relieve. Company C will be followed by the division's advance guard, which will arrive at the highway bridge at 0305. Since the highway bridge should be firmly in German hands by this time, the advance guard will cross over into Dvinsk and spearhead the division's northeastward advance. 3/

The Russians were able to explode the demolitions on the Railroad Bridge and offered stiff resistance from within the Fort which guarded the western end of that bridge. They were unsuccessful, however, in preventing the Germans from taking both bridges, and extinguishing the fires on the Railroad Bridge before it was destroyed. The Germans owed their success in this battle to the element of surprise and the fact that they made simultaneous attacks on both bridges.

When considering Daugavpils today, i.e., what type of city it is like and what type of construction is most common, it is necessary to plan for probabilities since there are no current unclassified maps available. Though there are exceptions, most urban areas of the world conform to an urban model developed by Dr. Richard Ellefsen of San Jose State University, while working for the Naval Surface Weapons Center. To develop this model, sixteen world-wide cities were studied to determine and quantify their characteristics with regard to their relation to possible military operations in urban areas. This urban model shows that the rapid expansion of the contiguous built-up area

since W.W. II has resulted in a common pattern consisting of: (1) the traditional city core; (2) a wide zone of urbanization consisting mostly of residences; and (3) a series of clusters of high-rise buildings (the outer city) located at principal intersections of major transportation arteries on the edge of the city. 4/ The outer nodes of the city contain new high-rise concrete wall and slab, and concrete framed structures with open recreational areas, schools and commercial activities expanding in that node to support the people who live there. Russia has encouraged this type of growth by design to obviate the need for increased ground transportation and refers to these nodes as "Mikorayons." Dr. Ellefsen points out the possibility of seizing these outer nodes and laying seige to a defending enemy within the city core. 5/ The urban zone contains the majority of housing and starts with one story single dwellings on the outer edge and becomes 3-6 story apartment complexes closer into the city. Within the city core are found numerous types of buildings. Older 2-4 story brick buildings with narrow streets (15 meters wide) are found along with high rise concrete buildings and major avenues (25 meters or wider). Many of the buildings within the city core are situated on the streetfront and provide observation and fire only to the tops of other buildings. Modern urban planning provides much more open space between buildings, and the wider avenues could represent ideal Nap of the Earth (NOE) corridors into the city

core. A last point made by Dr. Ellefsen is that the inner core is almost invariably exposed, at least on one side, to water. Open spaces in the form of parks and landscaped grounds offer the potential for landing troops by helicopter into the inner city. 6/

In comparing the two maps of Daugavpils (see Figure 5), it is easy to see the rudiments of the urban model developed by Dr. Ellefsen. The inset map, (1:250,000 scale), was prepared in 1968 and shows new arteries into the city, a major beltway around most of the city, and a new major airport constructed approximately 10 kilometers to the northeast of the city. The population in 1968 was estimated to be around 100,000 people. By contrast, the 1:50,000 scale map compiled in 1956 from maps of Latvia in 1928-30 shows that the city core lies on the north bank of the Daugava River and is centered upon the three rail terminals.

In this scenario, the 18th Combined Arms Army (CAA) Commander ordered the 9th Guards Motorized Rifle Regiment (GMRR) on the evening of 18 August to move to and occupy defensive positions in Daugavpils. The regiment's mission is to secure the three bridge sites on the Daugava River (two within the city and one bridge 7 kilometers to the northwest) and the new airport approximately 10 kilometers to the northeast. Due in part to the limitations MOUT imposes on armor and due to the tank losses already incurred during the delay, the tank battalion (minus one company)

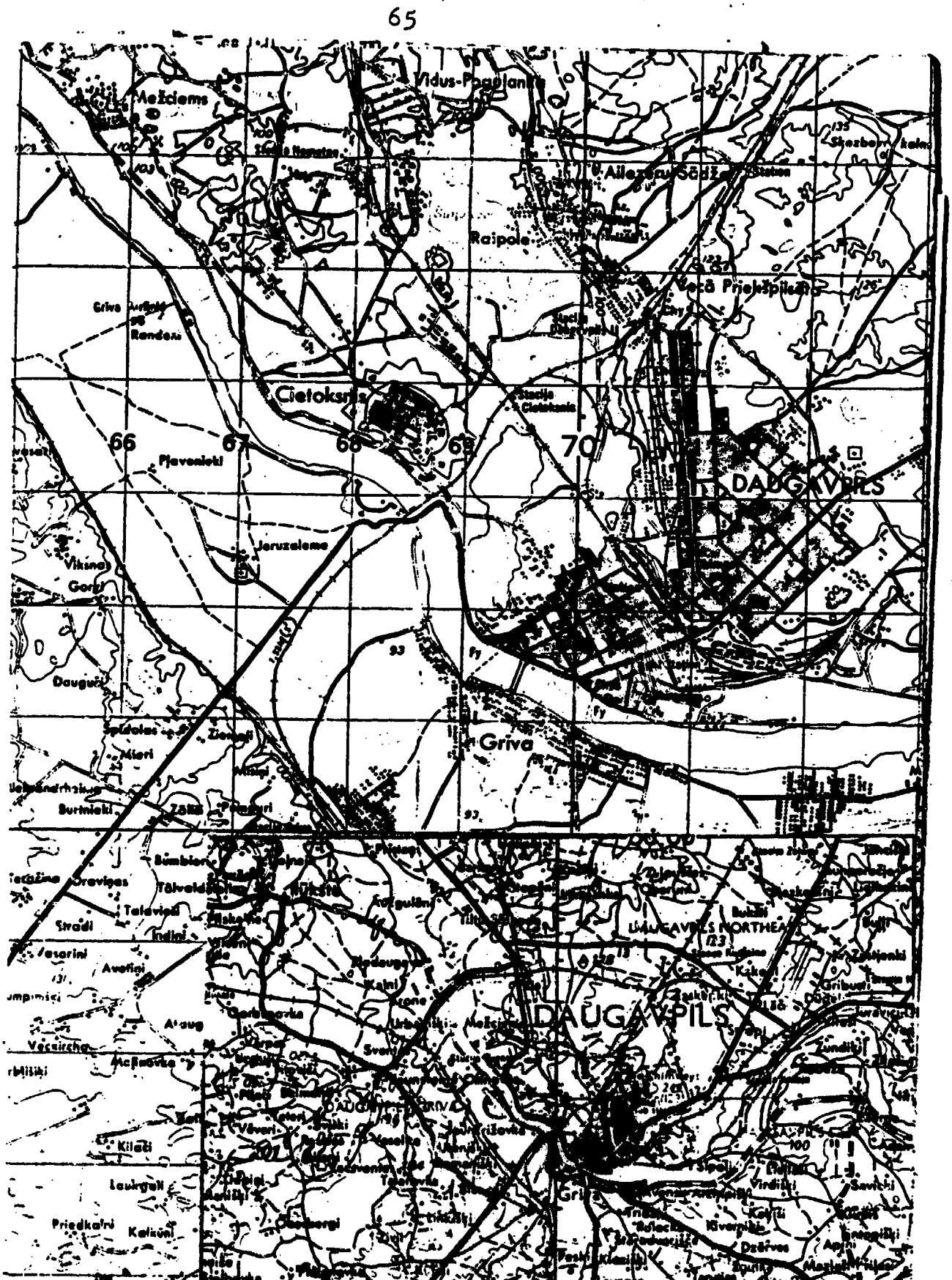


Figure 5. Map Analysis of Daugavpils

of the 9th GMRR was attached to the Division's Independent Tank Battalion. The regiment defending Daugavpils is composed of three Motorized Rifle Battalions (MRB), one Tank Company, one Howitzer Battalion (122mm Self-Propelled), an Anti-tank Battery, and an Anti-Aircraft Battery (composed of four ZSU-23-4's and four SA-9's). 7/

Based upon the mission to defend the three bridges and the airfield, and based upon the forces available, the Regimental Commander has given the first MRB the mission of securing the highway bridge linking Daugavpils and Griva and the second MRB has the mission tc secure the railroad/highway bridge near the old fort. Both MRB's have a platoon of tanks and a composite anti-aircraft section (one ZSU-23-4 and one SA-9) attached. The third MRB has one company dedicated to securing the new bridge 7 kilometers northwest of the city and one company securing the new airfield 10 kilometers to the northeast. Each company has a composite anti-aircraft section and an anti-tank section (four BRDM's carrying AT-5-SPANDRELS). 8/ The remainder of the 3rd MBR (one motorized rifle company and one tank platoon) constitutes the regimental reserve and is located in Vecā Priekšpilsēta (MB 7094) with a priority for employment to the 2nd MRB's area of operations (see Figure 6).

Due to the rail network present at Daugavpils and the fact that the two bridges there are only 1.5 kilometers apart, the 25th Armor Division Commander decides that the 1st Bde 47 AASLT should make an air assault to capture

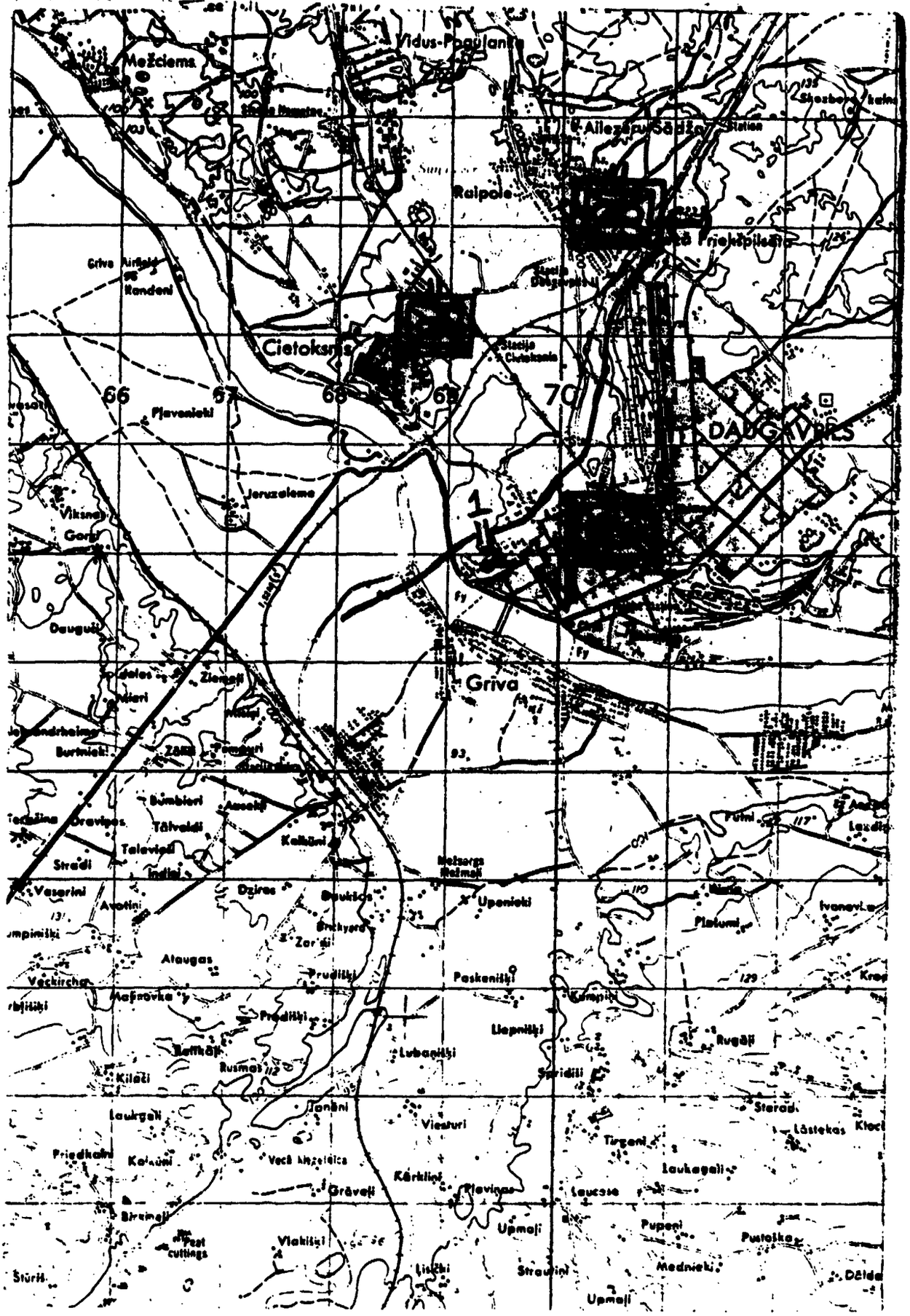


Figure 6. Soviet Defense of Daugavpils

those two bridges. The one bridge 10 kilometers to the northwest, and the main airport 7 kilometers to the northeast would be dealt with after link-up is made. Link-up is expected to take place within 72 hours of H-hour. H-hour for this operation is the Landing Zone (LZ) time for the first air assault elements into Daugavpils and is set for one hour after Beginning Morning Nautical Twilight (BMNT), or 0545 hours on 20 August. This time was selected to enable the aircraft to make the best use of the terrain available in the objective area. The risk is that enemy forces will detect the air assault in progress and alert possible targets, thus lessening the element of surprise, which is crucial for success. To preserve the element of surprise, the 25th Armor employs its Combat Aviation Battalion in three deception air assaults approximately 10 kilometers deep beyond the present FLOT (Forward Line of Own Troops). The deception missions are scheduled to start 15 minutes after the 1st Bde's aircraft depart on their first lift. If the deception were to go first, the enemy would be at a higher stage of alert when the first lift departs. This also gives the deception the appearance of being the most timely, accurate threat confronting the Soviets. Each deception assault will be composed of 10 UH-60's flying NOE 2 minutes apart in staggered trail with a heavy section of attack helicopters (3 AH-1S's and 2 OH-58D's) flying as armed escort. These aircraft will make 2 to 3 fake insertions and return.

The actual air assault by the brigade will consist of 80 UH-60 sorties and 33 CH-47D sorties to lift all assets of the brigade with sufficient ClIII (POL) and ClV (Ammo) to sustain them for 24 hours. The 1st Bn., 182d Inf. is given the mission of seizing the combination railroad/highway bridges adjacent to the old fort. (See Figure 7, item 1). The 1st Bn., 183d Inf. will capture the highway bridge at Daugavpils. Both of these battalions will receive 26 UH-60s and 8 CH-47Ds to lift their 520 combat troops in for the assault. One team of attack helicopter/scouts (5 AH-1S's and 3 OH-58D's) is placed OPCON to each battalion. Indirect fire is for the initial assault provided by one battery of the 1st Bn. (105, Towed), 61st FA, which is air assaulted by 7 UH-60's into the middle of an inaccessible swamp, 8 kilometers to the south of Daugavpils (MB 669 849). (See Figure 7, item 2.) The 1st Bn. (AASLT), 184th Inf. becomes the brigade reserve upon its arrival at H+3 hours and secures the majority of Daugavpils south of the railroad tracks which bisect the town.

Since 55 to 65 minutes are necessary for the NOE flight along different routes from the FLOT to the objective area (45 knots for 50 kilometers), the 52 UH-60's and 16 CH-47's making the initial lift of two battalions start lifting off of their company-sized pick-up zones at H-70 minutes (10 minutes prior to BMNT) with 6 flights of 3 UH-60's with 1 CH-47 and 2 flights of 4 UH-60's with 1 CH-47 being utilized by each battalion. These flights

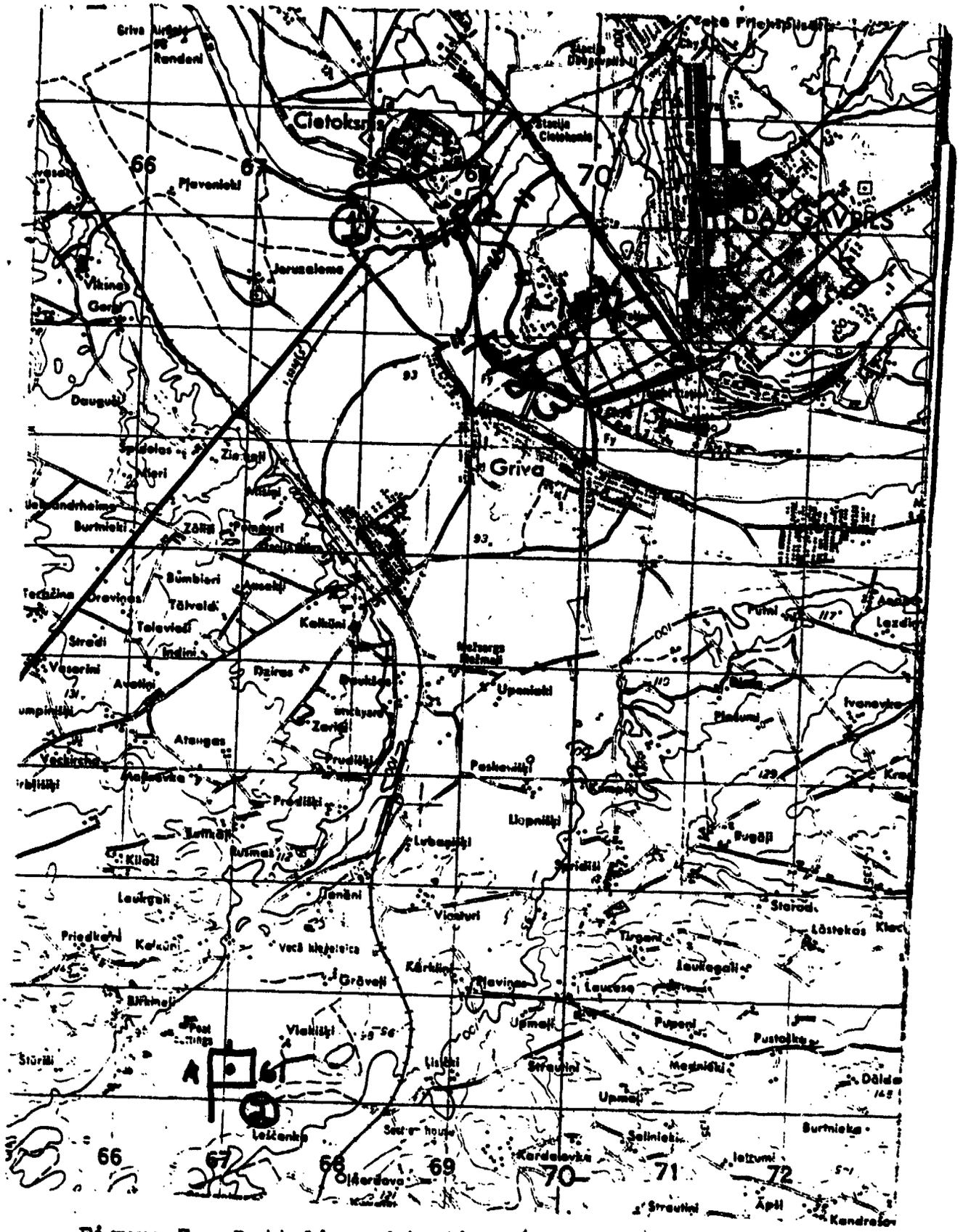


Figure 7. Battalion Objectives/Artillery location

have two minutes separation between them, and the aircraft stagger themselves to reduce their vulnerability. While penetrating suspected gaps in the Soviet zone, several flights are fired upon by small arms fire, but no significant damage is sustained. The deception aircraft lift off at H-55, three minutes after the last flight of the initial assault. Alerted by the earlier flights, the enemy's AA radars are actively seeking intruders. The AN/APR 39 radar warning receivers on board the aircraft have identified 6 ZSU-23-4 type radars (this indicates 2 regimental size units along the Division's FLOT) in either the acquiring or tracking mode. As one radar locks on an AH-1S, it fires a 2.75 inch, M130 chaffe rocket and breaks the radar contact, then hastily remasks. Two UH-60's and another AH-1S are not so fortunate; one UH-60 is lost to a ZSU-23-4 and the others are downed by SA-9s. After one fake insertion, the deception mission is terminated. Although they did not provide as much activity as they had desired, they were successful in attracting the attention of the ZSU-23-4s and the SA-9s which comprise the first two belts of the Soviets' air umbrella 4 to 6 kilometers from the FEBA. 9/ Remaining well below the radar coverage of the SA-6 and SA-4, the flight continues towards the landing zones at Daugavpils. Meanwhile, 7 UH-60's carrying the six 105mm towed artillery pieces of A Battery, 61st FA Bn with the firing crews, FDC and CIV are proceeding to their temporary fire bases 7 km short of the town. The ammunition load is tailored to

include plenty of smoke and variable time fuzes among the HE to provide cover and to assist with SEAD missions. Using slings just short enough to permit clearance for the gun, these seven aircraft have been given the best route into the area - one which is the most direct and follows the natural folds and streams, thus facilitating their NOE operation with a sling load. (See Figure 8.) These aircraft depart at H-75, 5 minutes prior to the first lift, so that they may be in position as the first calls for fire start coming in. No preparatory fires are planned. At H-10, the lead aircraft belonging to the 1st Bn., 182nd Inf. hits the RP at the northern end of Sventes Ezers (a lake) and follows a new road to the railroad track, then turns to a heading of 090° until it reaches the river. Because the bank is cut back on the northern side of the river, the aircraft hug this bank to take advantage of the concealment offered. Six landing zones are planned for at each bridge -- three on the north bank and three on the south bank. The center of the three landing zones will be as close as obstacles will permit to the foot of each bridge. The first flight of three leaves the safety of the undercut bank and crosses to the south side of the river. Ahead lies the old fort with the bridge just beyond. Adjacent to the fort, the aircraft receive sporadic rifle fire from a few startled sentries. Overhead wires at the foot of the bridge preclude touchdown there and all three aircraft swiftly flare and settle into an LZ at the water's

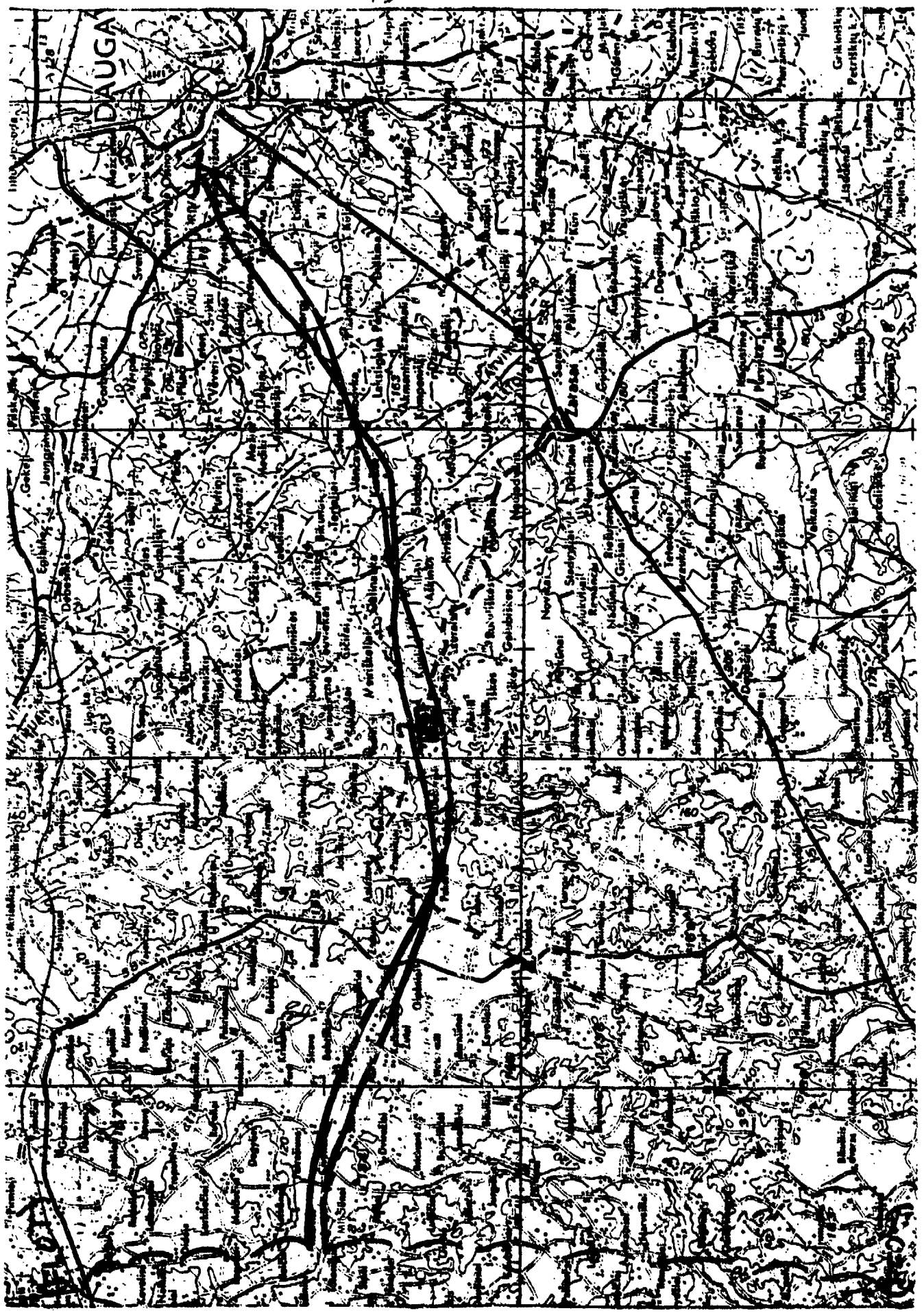


Figure 8. Aerial Route for Sling Loads

edge just 50 meters from the bridge. Quickly the three squads exit these aircraft and make for the bridge. The next flight of three is touching down on the north bank as the first flight is taking off. The north bank proves to be less restrictive and while the lead and trail ships land to the east and west flanks of the bridge, the center ship is able to land right at the foot of the bridge. Again the three squads immediately displace to the bridge and as the second flight takes off, both ends of the bridge are secure. Two squads begin clearing the bridge of demolitions while the other four squads establish hasty defensive positions and fields of fire for the battle which will ensue.

As the 3rd flight approaches the railroad bridge, their radar warning receivers indicate a ZSU-23-4 located midway between the railroad and highway bridges on the south bank is in the acquiring mode, and before they reach the fort the ZSU is tracking them. Having no terrain to mask behind, the aircraft continue to their LZ's while the lead ship quickly calls for SEAD support from the attack helicopters.

The attack helicopter team (opcon to the 1-181st) is split into heavy and light sections. The light section (2 AH-1S's and 1 OH-58D) precedes the first flight, but instead of turning at the river, they move into positions in the wooded swamp east of the town of Mežciems, 2½ kilometers northwest of the bridge. (See Figure 9, item 1.)

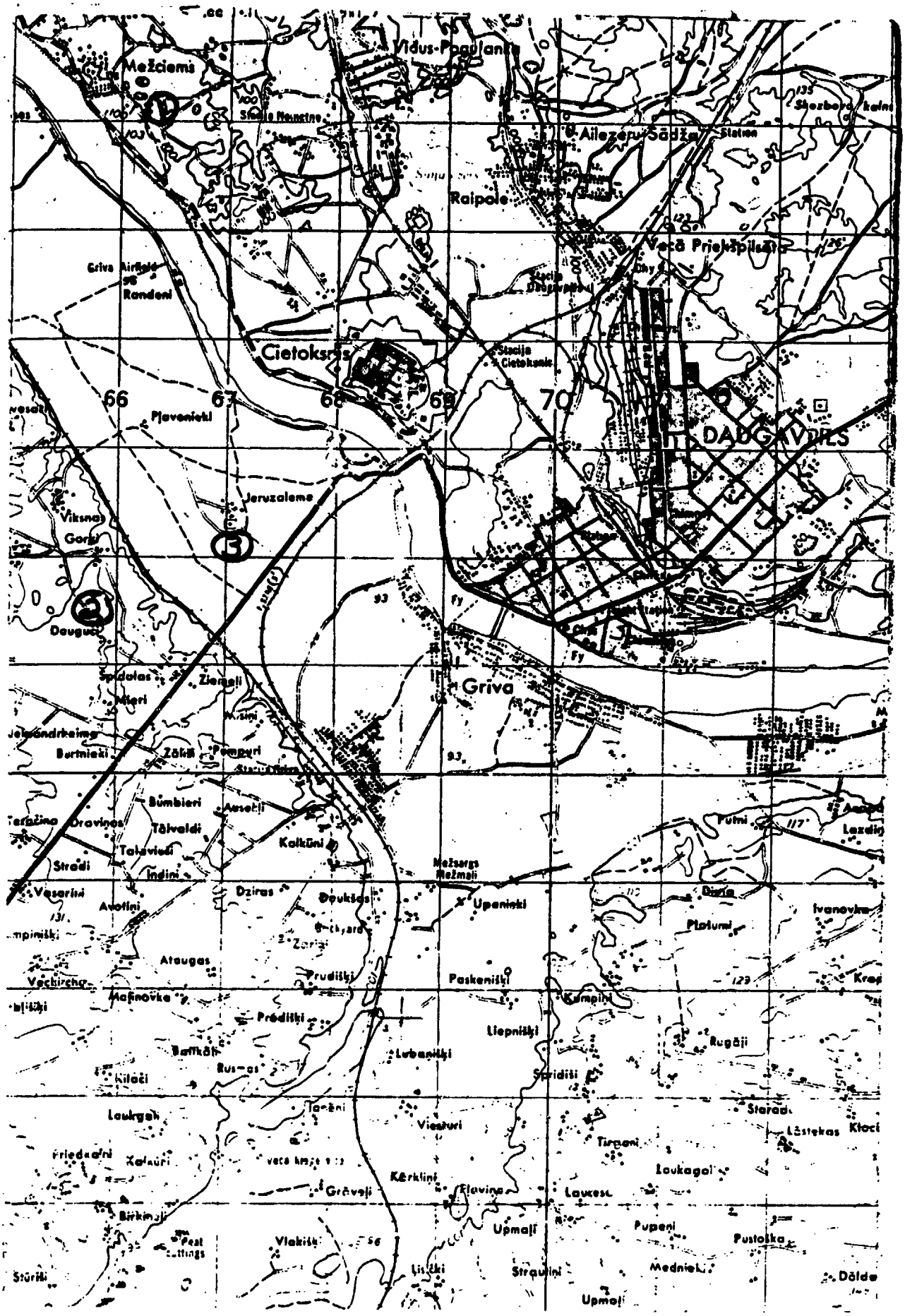


Figure 9. Attack Helicopter Team's SEAD Battle

The heavy section (3 AH-1S's and 2 OH-58D's) follows the railroad tracks southeast to Borovka (642 946) and then turns south following the low ground and the folds of the earth towards Dauguci (659 912). (See Figure 9, item 2.)

When the request for SEAD is received, the heavy section responds and moves into positions behind and adjacent to the village of Jeruzaleme (Figure 9, item 3). Before the Cobras reach their firing positions, the 3rd flight of UH-60's reports receiving fire from the ZSU and heavy machine gun fire from the fort; one UH-60 is destroyed and the other two received major damage. The "Air Battle Captain" (ABC), who is the platoon leader, immediately executes a cyclic climb to 80 feet hoping for a radar indication to obtain a bearing to the ZSU. Three seconds elapse, then five, and the ABC attempts to discern the location of his threat, when suddenly a bright flash occurs and the ABC's aircraft falls to the ground burning -- a victim to an SA-9 which is working with the ZSU-23-4.

The remainder of the heavy section takes up positions around Jeruzaleme and starts hitting the fort with TOWS and 2.75 inch multi-purpose sub-munition rockets, while the first artillery impacts. Soon, the artillery pinpoints the fort and silences the heavy machine gun fire. The remaining scout with the heavy section moves to the orchard between Jeruzaleme and the main road leading to the bridge (Figure 10, item 1). As he trys to locate the ZSU and the SA-9 positions, the forces on the bridge report

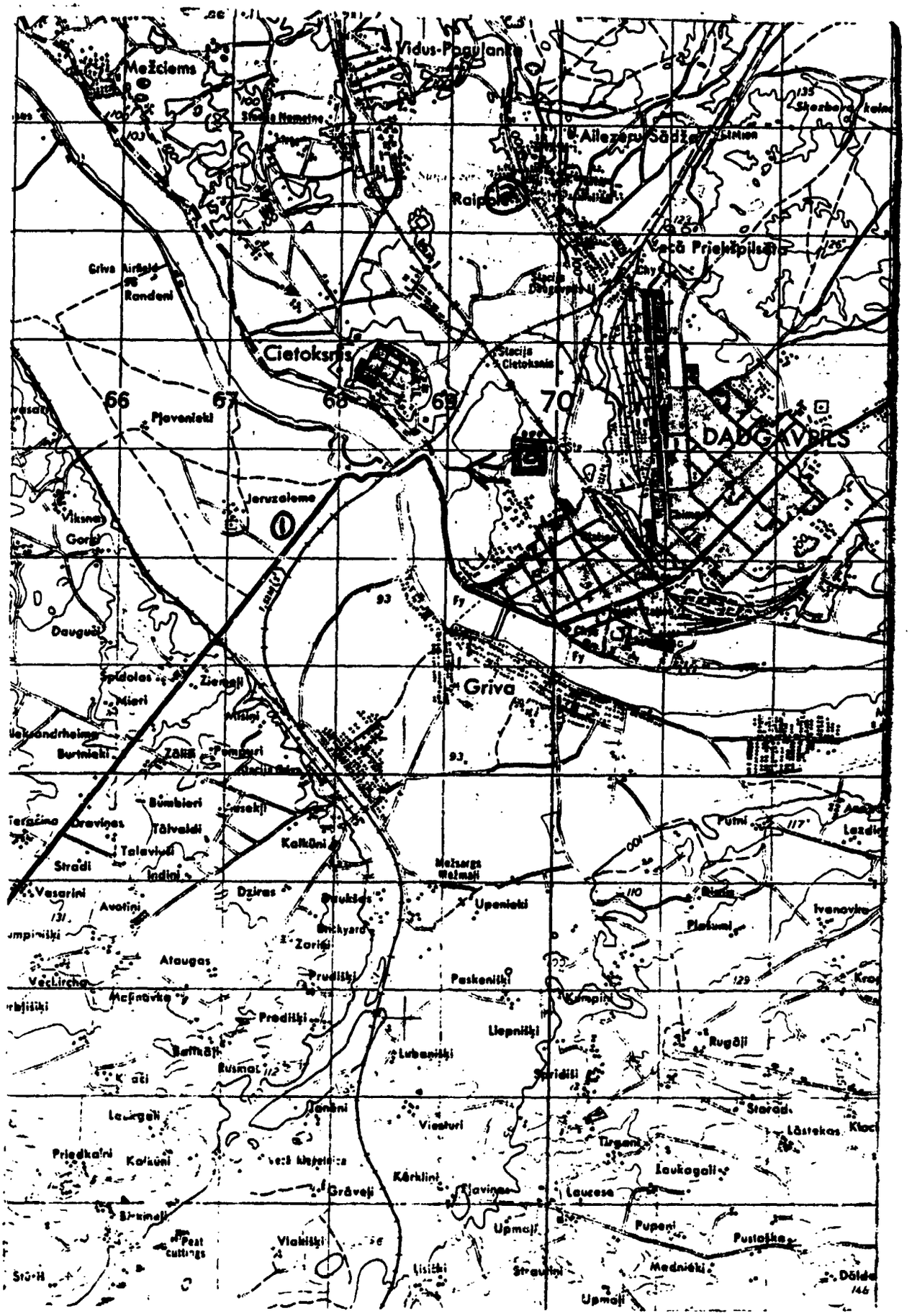


Figure 10. Maneuvering Against the Counterattack

a platoon of tanks moving towards them from Daugavpils. The light section maneuvers against this threat. Repositioning to Raipole (6995), the light team quickly disposes of the four tank platoon by firing their TOWS at 3000 meters and using the homes on the outskirts of the village for masking (Figure 10, item 2).

With the fourth flight of three on the river only three kilometers away from the bridge, the heavy section presses the action to provide adequate suppression of enemy air defense assets in the area. Using slow running fire the 3 AH-1S's move together, firing their 20mm guns into the outskirts of the village of Griva which is the general location of the ZSU-23-4 and the SA-9. As the Cobras advance directly towards the area to present the smallest target, they receive an indication of a threat radar on their AN/APR 39 receiver. The scout then detects through his mast-mounted sight (MMS) the steady side-to-side movement of a dish-shaped object. With the rising sun, a shadow from a large barn had hidden the ZSU from sight. Alerted to its position, the AH-1's use 2.75 inch multipurpose submunitions to destroy the ZSU.

Remasking, the AH-1's stay low to preclude the SA-9 from firing at them while the scout OH-58 repositions to locate the SA-9 which is now totally reliant on visual acquisition with the ZSU destroyed. As the fourth flight of UH-60's flares to drop into their LZ's at the southeast edge of the bridge, the SA-9 fires two missiles in ripple

fashion destroying two of the UH-60's. The AH-1's quickly fire two 2.75 inch HE rockets each at the SA-9, thereby destroying this enemy system.

With a reinforced company on the ground and the ZSU/SA-9 team silenced, smoke is used on the north side of the river to screen the assault aircraft from the small arms fire which had been growing in intensity from the town of Cietoksnis. To better utilize the smoke, the RP and flight route changed so that the remaining aircraft would be approaching along the main highway from the south. Using the point target destruction capabilities of the attack helicopters, the infantry quickly secure the fort and begin a house-to-house clearing operation of the one block on the southeast edge of Cietoksnis. Other than the fort, this one block is the only terrain from which the Soviets can place small arms fire on the railroad/highway bridge. The attack helicopters and OH-58 scouts OPCON to 1-182 begin screening the two main routes, north and south, into the area in case of a counter attack.

At the highway bridge between Griva and Daugavpils two kilometers upstream, 1-183 gets two flights of three UH-60's into their LZ's and secures the bridge intact before they run into trouble. Heavy sniper, machine gun, SA-7's and Sagger anti-tank missiles firing from the roof-tops and buildings overlooking the Daugava River shoot down all three UH-60's in the third flight as they make their approach to the bridge along the river from the east.

Additionally, a ZSU-23-4 teamed with an SA-9 in the railroad yards just east of Daugavpils is successful in destroying one AH-1S and the OH-58 from the light section before the second AH-1S can attack them.

Due to the intense fire along the river, subsequent flights are diverted to a new route starting at a small lake 1 kilometer northeast of A Battery 61st FA and following a stream called Lauce to the southern edge of Griva, staying masked behind the dwellings as they approach and depart. With two platoons finally on the ground securing this new LZ, the next two platoons move to link up with the troops on the bridge. As they approach the bridge, they begin receiving fire. Crawling forward they discover that a Soviet Motorized Rifle Platoon with three BMP's is only 50 meters from them, firing in the direction of the bridge. The shots that made them take cover come from their own troops on the bridge firing at the Soviets. Quickly they maneuver and hit the Soviet platoon from the flanks, killing 17 and capturing the remainder.

With linkup complete, the ABC of the attack team uses the houses along the river to mask behind as he identifies sniper positions on the east side (Figure 11, item 1). At his direction, the Cobras unmask one and two aircraft at a time, fire, then quickly remask and move to alternate positions. Using the 20mm gun and 2.75 inch rockets with HE delay fuzing to blow a hole in the buildings and flechette rockets set to detonate at 200 meters, the team

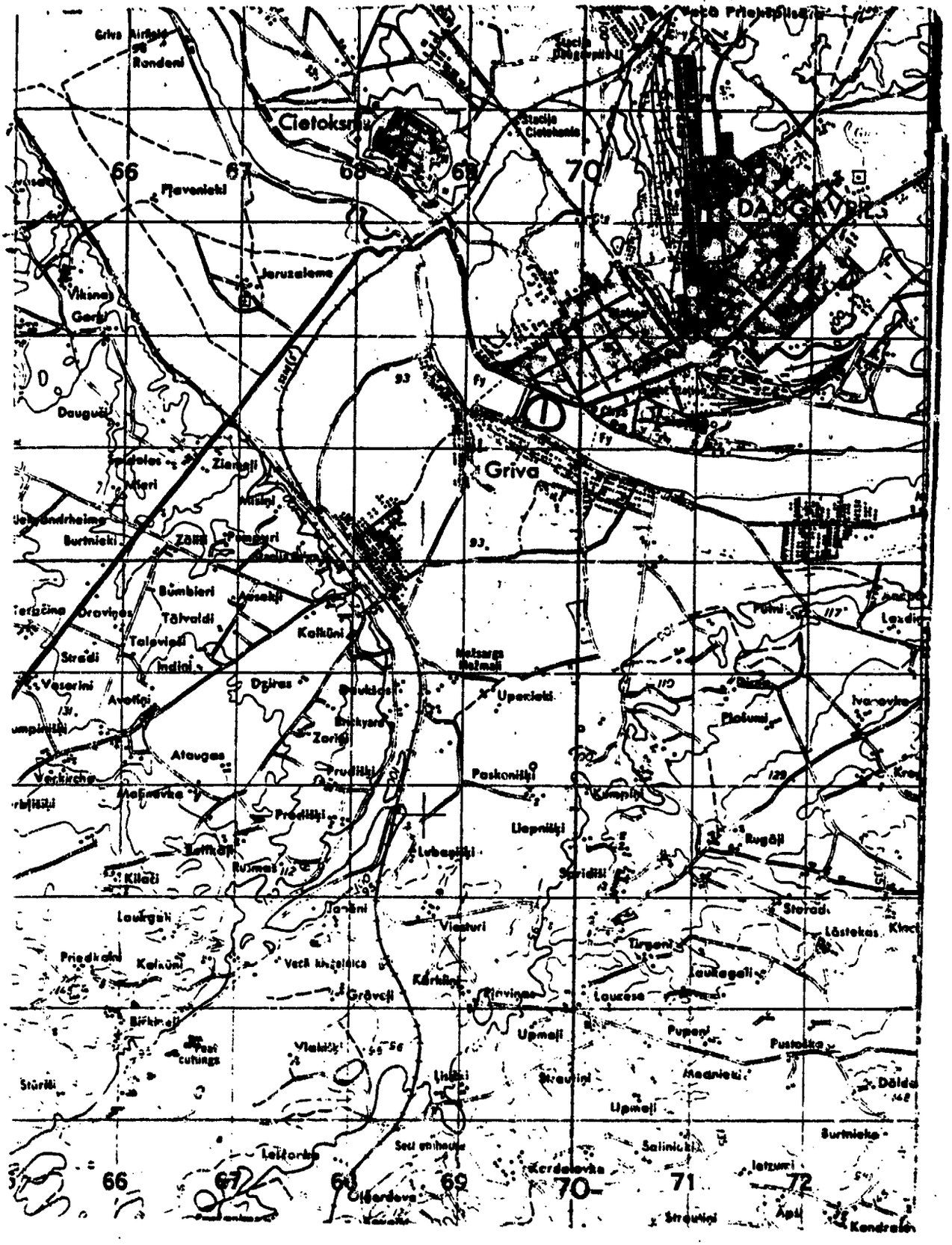


Figure 11. Eliminating Snipers

quickly eliminates the majority of the snipers from the windows and the rooftops without rubbling the buildings.

As this fire fight subsides, the CH-47's start arriving with their troop loads. With the increased number of forces on the ground, the 1-183 Bn. Commander starts clearing the riverside block of houses in Griva and moves west to link up with the 1-182d on the south bank. When the three CH-47's carrying the FARP arrive, they are positioned next to the LZ south of Griva until their final location on the far side of the river can be secured.

Within minutes of their arrival, the two CH-47's with internal fuel stores have their generators cranked up and are ready to start hot refueling. The third attack helicopter team has accompanied the CH-47's and replaces the team working for the 183d which has just finished clearing the river line of snipers. After the second team finishes rearming and refueling, they will pick up a screen mission east of Daugavpils, tying in on the north and south with the first platoon which is screening to the west.

By H+25 minutes, both bridges are secure, the majority of the 182d and 183d Battalions are on the ground, a fresh attack helicopter platoon is on station and another is being refueled and rearmed. Friendly casualties thus far include 69 soldiers killed and 35 wounded with 6 UH-60's, 2 OH-58's and 1 AH-1S destroyed and 2 UH-60's severely damaged. Three tasks remain for the brigade to

complete their air assault mission; first an air corridor must be established around Daugavpils to prevent reinforcements of supplies from reaching the Motorized Rifle Regiment which still controls the city; secondly, the 183d must clear the triangular-shaped three city blocks which front the river on the north side of the highway bridge, and finally, the 184th Battalion must clear 14 blocks of the city up to the railroad tracks to adequately protect the Brigade against a counterattack from the Soviet Regiment (Figure 12, item 1).

With the first and second attack helicopter platoons establishing a screen around the city, the third platoon leader is ready to assist the 183d in clearing their portion of the city. Six UH-60's remained to provide a lift capability. The remaining UH-60's and CH-47's are enroute back to pick up the 184th Battalion which is awaiting their PZ time of H+2 hours. The majority of the terrain within the three block triangle consists of 2-3 story brick buildings with narrow streets about 15 meters wide. There are two newer concrete buildings which are 8-10 stories high and parking lots and landscaping around them. Five brick buildings about 4-5 stories high with vaulted tile roofs are interspersed. Almost all of the buildings have antennaes on them except for the two tallest ones.

Having analyzed the terrain, the UH-60 and the attack helicopter platoon leaders discuss their employment with the battalion commander. Together they agree that to

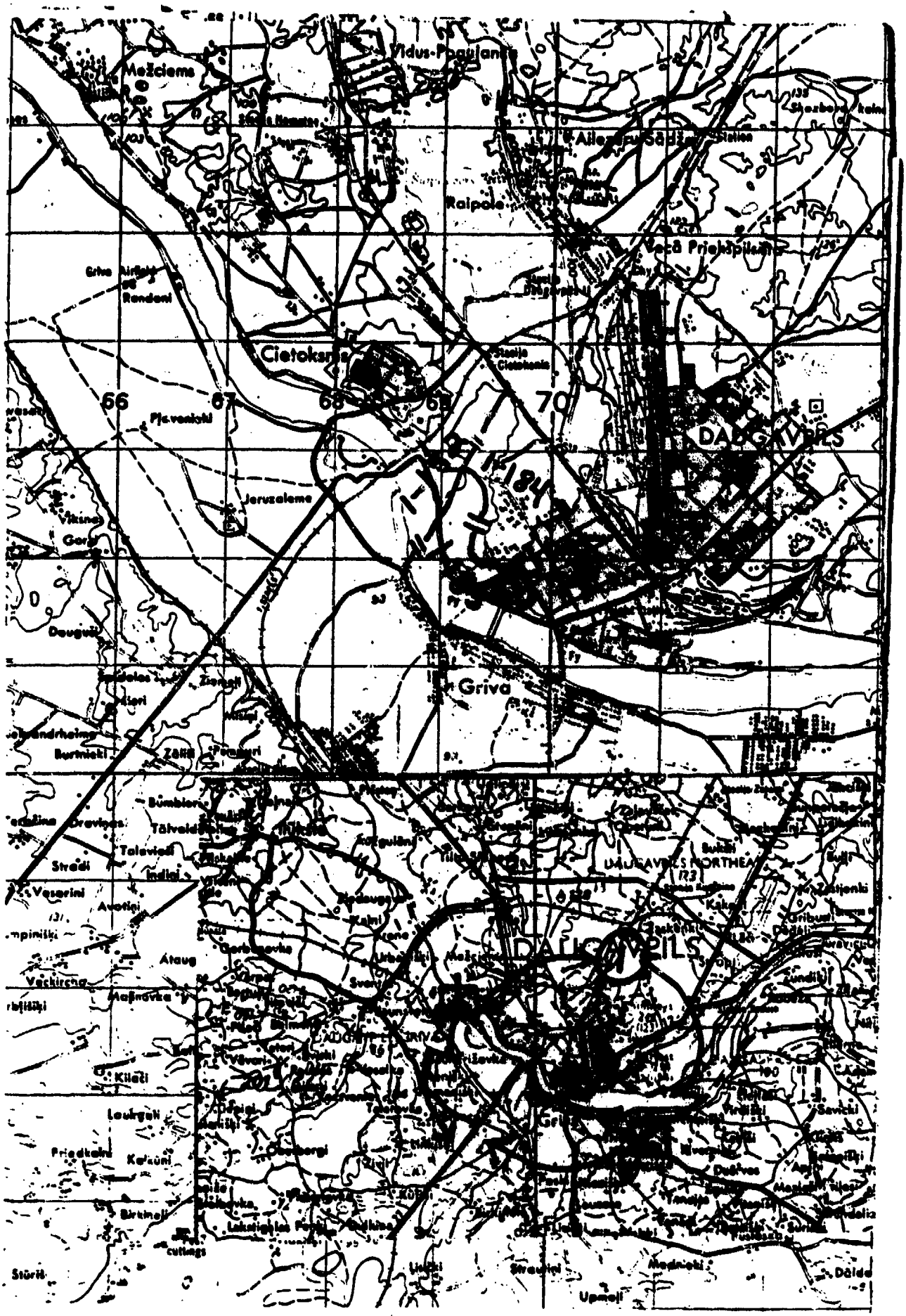


Figure 12. Sealing the City

accomplish the task, they must occupy the tops of the buildings which provide the best observation posts and fields of fire. (If the maps for this city had elevation markings for the buildings or, were three dimensional to indicate intervisability and relative heights of the buildings, planning for this operation would have been easier. A simultaneous assault for the city proper could have been made. Without this information, the brigade had to perform a reconnaissance to determine key objectives in the area.) Using the taller buildings to mask the approaches from buildings in the rest of the city, the UH-60's will approach the three blocks from the southwest flying NOE over the river, then "pop up" to the level of the 2 and 3 story buildings along the river. They then fly NOE "above the rooftops" keeping "their building" between them and the rest of the city to the northeast. The telephone and electrical wires are on poles along the streets, so the various antennas are the only wire hazards they must watch for. As they approach their designated buildings, they will do a cyclic climb to the top, pedal turn, and in the case of the four UH-60's, head for the 4-5 story brick buildings, and hover there while the troops rappel onto the roofs below. The two UH-60's going to the newer concrete buildings land to discharge their troops.

The attack platoon positions the light section behind the buildings and trees on the left (north) of the objective area. From this position the scout can observe

the flank of the objective area and beyond using his mast-mounted sight. The two Cobras with him are distant enough to be able to fire TOWs (minimum range of 500 meters) or 2.75 inch rockets. The TOW firings cannot be into the objective area because of the loose wire hazard they can introduce. The heavy team provides suppression with their 20mm and 2.75 inch rockets as they lead the UH-60's into the area. Use of the 2.75 inch rocket is limited to targets approximately level with or above the AH-1's and are farther than 100 meters away. (The distance is necessary to arm the rockets while the level has to do with the trajectory. The pylons on the AH-1's are fixed; therefore, if a target presents itself on the street below, or on a rooftop below, the AH-1's cannot hit it with a 2.75 inch rocket. To do so, the aircraft would have to be in an extremely nose low altitude, and with a helicopter, this would result in rapid forward movement. To fire down at close ranges, the rocket tubes would have to be boresighted at a point on the ground immediately in front of the helicopter instead of 1000 meters away.)

During the air assault, four of the six UH-60's reach their objectives and discharge their troops. One UH-60 is hit by an RPG-7 and one UH-60 has a tail rotor strike caused by the antennas on its objective; six of the ten soldiers on board that aircraft rappel to safety before the aircraft spins out of control to the roofs below. Three SA-7's are fired but miss their targets due to the

IR jammers onboard the Cobras. With these rooftops secure, the 183d begins a clearing operation under cover of their troops above. The light team continues to observe the area to the north to prevent any possible counterattack.

At H+3 hours the 184th Battalion arrives and assaults their portion of the city in a similar fashion. Although the fighting continues in pockets for several hours, the brigade objective is secured by 1230 hours, almost seven hours after the first aircraft landed.

Having lost the two bridges and approximately three companies in the initial thirty minutes of the battle, the Soviet Regiment falls back to its second defensive belt northeast of railroad tracks which split the lower 1/3 of the city. By nightfall three counterattacks have been repulsed and the 1st Bde., 47 AASLT settles into a defensive position to await linkup.

During the next two days, helicopters are used extensively. They provide a lifeline for the brigade and keep it supplied with ammunition as well as evacuating the wounded. The attack helicopter/scout team keeps the city isolated and prevents relief attempts from the companies at the airfield and the bridge site to the north. Utilizing a FARP well forward, the aircraft are able to remain where they are needed and give the Brigade Commander the firepower, shock action and mobility he needs in this urban jungle.

In this scenario, an airmobile force assaulting forty kilometers deep into enemy territory was depicted as successfully securing an objective intact (the bridges), and then defending this objective until link-up was made. During the initial assault to capture the city, 13 aircraft were lost. During the subsequent defense of this objective, it is envisioned that losses would amount to 5-10 aircraft per day. Total cost for this operation would range from 20 to 35 percent losses of U.S. men and equipment.

Another option might have been the use of an airborne assault to capture the objective of Daugavpils. Airborne soldiers could achieve the same element of surprise if they reached the objective area undetected by the enemy air defense systems. It seems unlikely, however, that such a force could achieve surprise. The enemy's air defense umbrella is much more effective against tactical transport aircraft than helicopters; hence, friendly losses could conceivably exceed the 20-35 percent estimated losses incurred by an airmobile assault. The relative scarcity of airborne forces also favors the use of an airmobile assault to capture this city.

The next chapter draws upon rationale such as that presented above to form the conclusions for this thesis.

CHAPTER IV

END NOTES

1. Department of the Army, Command and General Staff College, Advanced Offensive Tactics, A390, November 1981, pages 9-58.

2. Scholin, Allen R., "Joint Deployment Agency goes to Work," Air Force Magazine, Vol. 63, No. 1, January 1980, page 54, as excerpted from Appendix B, United States Military Posture for FY 1980, prepared by the Organization of the Joint Chiefs of Staff.

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5. Ibid., pages 74-75.

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7. Department of the Army, Command and General Staff College, Tactics, RB 100-35, July 1981, page G-4.

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CHAPTER V

CONCLUSIONS

The conclusions of this thesis are simple and straightforward as they relate to aviation in the support of MOUT. The implications, however, will remain elusive until such time as they are tested and proven, or disproven, on the battlefield. The scenario represented in this thesis used existing doctrine and, for the most part, techniques practiced by aviators today. The only thing unusual about this scenario was the substitution of asphalt and concrete for vegetation and hill masses.

The following conclusions emerged from this research:

1. The techniques for survivability on the battlefield apply, regardless of setting. Remaining unmasked for only short durations, providing the smallest possible target, and the use of the Soviets' weapons systems limitations against them (i.e., minimum altitude restrictions for firing) are techniques that are applicable to aviation survivability in MOUT or elsewhere. The enhanced capabilities provided by Aircraft Survivability Equipment (ASE) also expand the opportunities to use Army Aviation in most situations - MOUT included. Greater ballistics protection

is especially helpful for MOUT due to the threat posed by the individual soldier.

2. Obstacles such as wires are more plentiful in MOUT, however, their mere existence does not preclude the use of aviation in such an environment.

3. The importance of the individual city's terrain to the conduct of the operations therein, requires intensified mapping efforts for all areas of potential conflict. Such maps should have a relief feature applied to assist in the identification of key terrain during planning.

4. Helicopter weapons have limitations for employment in MOUT, either for minimum ranges or, as is the case with the 2.75 inch rocket, aircraft attitude preclusions. There are techniques for overcoming such limitations. Boresighting the rocket tubes for extremely close targets will permit using the 2.75 inch rockets in most situations.

5. Helicopters could be used in MOUT today as they are currently configured. Research and development activities for new airframes, packages, and weapons will improve upon capabilities, but there is no need to wait for new systems to materialize before using helicopters in the support of MOUT.

In summary, the reader of this thesis is left with some thoughts from S.L.A. Marshall, who when discussing the absence of literature on urban warfare states:

> Most of it deals with shadow rather than substance, with theory and with main command considerations more than with techniques and with lessons learned.

> All of this is because the men at the point of white heat are seldom interviewed and their personal experiences are rarely recorded in any detail. Urban warfare is regarded as an exception, an occasional and unhappy accident, far away from the main stream. War, when properly conducted, according to human superstition, belongs in civilianless open countryside. 1/

The use of helicopters in MOUT is not an impossibility, just as the use of helicopters in jungles was not an impossibility during the early 1960's. Like anything else, you only fight well when you are well trained. The use of aviation in MOUT is a capability we cannot ignore. We must plan for aviation support in MOUT and practice this for then if you or I shall ever have to perform this mission, the fear of the unknown will not be with us.

CHAPTER V

END NOTES

Marshall, S. L. A. "Notes on Urban Warfare," Army Material Systems Analysis Agency (AMSAA), Special Publication No. 6, Aberdeen Proving Ground, Md, April 1973, page 63.

APPENDIX

Areas which were discussed in this thesis but for which no conclusions can be drawn at this time and are therefore in need of further study include:

a. Helicopter weapons should be studied in a MOUT environment by the Aviation Research and Development people before a Required Operational Capability (ROC) for such weapons is finalized. The Infantry are getting very good at determining back blast and penetration effects; such considerations plus those of minimum ranges, articulated weapons stores, and others need to be considered by the aviation community.

b. Ongoing efforts on wire detectors/cutters need to be expanded to give all aircraft a short-term degree of protection. Future research needs to then expound upon such a self-protect capability and to postulate mission requirements to eliminate such obstacles to employment.

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